October 26, 1942

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

SHEARED STEEL PLATES
FLANGED AND DISHED HEADS
WORTH STEEL COMPANY · CLAYMONT, DEL.

War Against Wear

DUST "BLANKET" NOW MORE DANGEROUS

The more dust that accumulates in the wound section to "blanket" a motor, the more danger of destructive temperatures. *And today's round-the-clock operation gives a motor little chance to cool off!*

In a production war like this one, everything that harms our motors helps the Axis. Dust, moisture, stray oil, friction — *every* motor enemy must be fought with skill and energy!

IS PART OF THE WAR

Against the Axis

CLEAN MOTORS MAY LAST 5 TIMES LONGER

A clean motor will run cooler—last longer — build more guns — than a motor in which dust plugs ventilating passages and "blankets" windings.

But improper removal of dust can do as much harm as dust itself. *And wartime is no time for trial-and-error maintenance!*

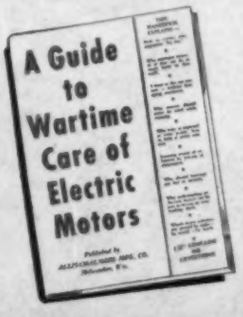
That's why Allis-Chalmers has published — *and offers free* — "A Guide to Wartime Care of Electric Motors."

AROUND WORLD IN 8 DAYS — rotor travel in many motors working 24 hours a day for Victory!

Send for this Valuable new Book. It's Free! →

Everyone taking a fresh, new look at his maintenance operation will find "A Guide to Wartime Care of Electric Motors" immensely helpful.

It's completely illustrated, clear, highly interesting—applies to *all* makes of standard, general-purpose motors. Contains no advertising. Belongs in every engineer's and executive's technical library.



ALLIS-CHALMERS MFG. CO.
Advertising Dept.
Milwaukee, Wisconsin

Yes, I would like to receive *free of charge* your new motor care book.

(Name)

(Title)

(Company)

(Street Address)

(City and State) A 1536-1

ALLIS-CHALMERS
MILWAUKEE

WE WORK FOR VICTORY
WE PLAN FOR PEACE

THEY SAID IT COULDN'T BE DONE

The steel disc at the right is coined, drawn and annealed in a series of steps into the 37 mm. artillery shell case. A fine, selected grade of steel is required to withstand the severe deep-drawing operations that are involved, and to meet the exacting requirements of fast automatic extraction from the gun.

Make shell cases from steel? Impossible! Non-ferrous metal had always been used, and years of experiment had failed to produce a material that could do the job as well. Shell cases must meet exacting requirements. They must satisfactorily resist splitting and breaking . . . they must prevent expanding gases from leaking back into the breech . . . they must not stick in the gun after firing.

With the coming of war, non-ferrous metals were needed urgently for hundreds of other critical war jobs, and something *had* to be done, *and fast*.

Today, after intensive research and experiment, the impossible has been accomplished. Problems of extraction and steel quality that had seemed insurmountable have been solved. The result: a steel for shell cases which is being successfully used in large tonnages.

Bethlehem has taken a leading part in the development and production of artillery shell-case steel. Hundreds of tons of steel have been produced at Bethlehem mills for the shell case manufacturers. And correspondingly large quantities of strategic material have been released for other war uses.

In overcoming this problem, as in many another pressing problem connected with the war, steel has supplied the answer. While working 24 hours a day to produce more steel and better steel, we're at the same time applying continuous research and development to help solve technical problems with a vital bearing on the war effort.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Building

ships faster for the A·E·F·

Two great war industries — one launching ships with almost incredible speed, and the other breaking new records in the delivery of propulsion machinery — count their Monarch lathes as highly essential units of their plant equipment.

The photograph at the right, taken in the shipyard, pictures an "old-timer" boring a half-bearing on an 18" Monarch. This is just one of the thousand and one lathe jobs being done in this yard on Monarchs.

•

The young man at the left, who helps to build propulsion machinery, is turning an adapter plate for a balancing machine used for testing parts of the huge turbines that drive our transports and cargo ships. As will be noted from the sign, this Monarch did the first cutting in the $26,000,000 plant, and here Monarchs are widely used for tooling as well as for production.

Whether it be maintenance work, an emergency job or a mass production project, the accurate and fast performance of Monarch lathes is helping these two plants and others to reach new records in shipbuilding.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES

COVER THE TURNING FIELD

BEHIND THE SCENES

The Pay Off

■ We're going to have to call off the dogs on our offer of a free subscription to STEEL for anyone who could top our hometown of Hudson, O., for scrap metal per capita collected so far in the nation's drive to keep the furnaces roaring for victory.

Not that Hudson hasn't done a marvelous job, delivering this last week another overloaded freight car to the mill, thereby boosting the per capita amount up half again at least. But actually the scrap is coming in so fast now, the country over, that new records are being posted almost hourly.

Lee, Mass., claimed national scrap honors with 290 pounds per person but the next day three Vermont communities hopped all over this claim. Wolcott, Vt., reported 393 pounds per capita, Hyde Park, 400, and Cambridge 462.

And so it went all over the country with home town pride swelling with each pound added to the pile. Top honors so far seem to go to the thriving metropolis of Peetz, Colo., population 207. Up to Oct. 11 these two hundred and seven American citizens had collected 225 *tons* of scrap and had their eyes pinned on 240. C. P. Thompson, campaign chairman and former mayor, said: "There were no generals in this scrap army—everybody was a private and worked like one."

Subscriptions to STEEL's complete wartime information service are being duly entered for all and sundry who embarrassed us.

Production Illustrations

■ In the August 24 issue, STEEL carried an excellent article on "Production Illustrations" in which it was stated that companies desiring information about this method can obtain it by contacting the Training-Within-Industry Department of WPB.

Mr. C. R. Dooley, Director of TWI, after reading the article, pointed out that TWI was not set up to handle these inquiries, but that the Engineering, Science, Management and War Training extension of the California Institute of Technology is sponsoring the production illustrations training program. Mr. Dooley has now more recently written that TWI will be glad to promote the use of production illustrations, calling attention to the facilities offered through ESMWT of California Tech. It is believed that the TWI field officers will have available a brief folder describing the facilities and services offered in this kind of training.

Largest Roll

■ We hope you had a chance to stop and study the oil painting hanging in the booth of the Ohio Steel Foundry Co. at the Metal Show. It was a beautiful painting, done by Ralston Thompson and presented recently to John E. Galvin, president of the company, by his associates commemorating the pouring of the largest roll in the history of their foundry.

Glad To Help

■ An interesting sidelight to the Lincoln welding awards comes from Regis F. Fey, Pittsburgh-Des Moines Steel Co., and one of the prize-winners. He writes Pittsburgh Editor Hartford:

This is a rather belated reply to your letter of June 13, 1941, in which you assisted in my efforts to determine when the first all welded blast furnace was built.

At that time, I was preparing a paper on "The Modern Welded Blast Furnace" to be submitted in the Lincoln contest, and I have heard recently that the paper was graded second in its classification.

Welcome Home

■ Absence, we've heard for years, makes the heart grow fonder and this week we're inclined to agree, the reason being this letter from the King Axe & Tool Co., Oakland, Maine:

Kindly re-enter our subscription for STEEL to commence at once, and send us the bill.

Since cancelling our subscription we have found that your paper is much more valuable to us than we had realized, and that another paper does not take its place.

Mail Bag

■ We're sure you'll find this letter from Robert E. Kinkead as interesting as we did:

"Army Ordnance and yourselves are to be congratulated on your series on Conservation and Substitution in Ordnance Work. Obviously these officers are highly competent and courageous. They are doing a very patriotic act in publishing this sort of material. It shows what the Army is up against in getting ready for all out war. The fact that the situation is being so well met should be a source of gratification to the country at large.

"Everyone who has had contact with Army and Navy designs has been bewildered at the dumb things their designers have perpetrated. Sometimes we have been inclined to think that the Dictators were probably right to shoot engineers who pull dumb tricks which hold up our war effort. The effect is exactly the same as sabotage although the spirit might have been perfectly legitimate. Some of these boners have had such a damaging effect that we have tried to think the thing through and see what ought to be done about it. But the responsibility finally goes back to the whole people and there is no punitive action we could take now that would be just to all concerned.

"After all, the people of this country fought off any appropriations of money to get engineering designs ready for war. Their representatives in Congress merely reflected the will of the people. There was no hope of reward or prize for virtue in the military establishment in time of peace for civilians. No matter how well trained and enthusiastic the civilian was when he went into the military establishment in time of peace, in nine cases out of ten he arrived at the "what's the use" stage within a year and stayed that way. They could be picked out and publicly disgraced now but it would be an injustice and futile.

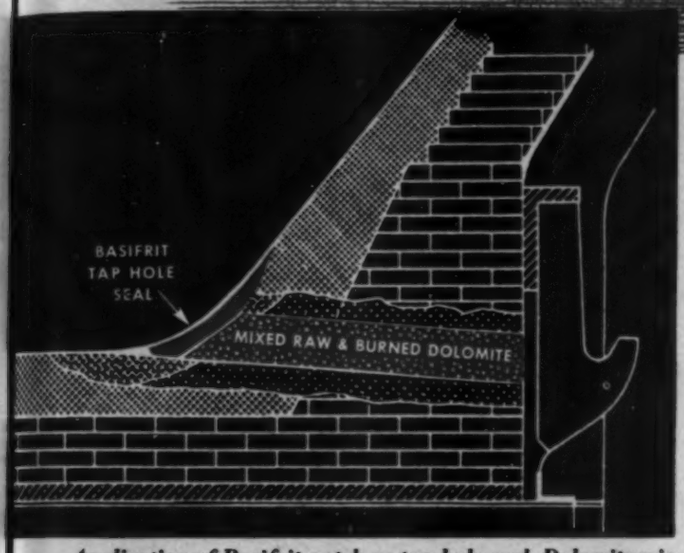
"Again, congratulations to Col. Redall, Capt. Taylor, and Lieut. Wolf. With officers like these the job can be done."

■ Robert J. Painter, American Society for Testing Materials, in commenting on the same series of articles on Conservation and Substitution says:

STEEL is doing an excellent job in keeping the harassed technical and business people in touch with things that they really have to follow.

Vol 111, No 17, October 26, 1942, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

"What can you do for hard taps?" he asked the Basic Engineer



Application of Basifrit patch as tap hole seal. Dolomite mix is dug out of tap hole in usual way. Then Basifrit seal is broken easily with rod.

Basifrit is soaked thoroughly with water and then shoveled in quickly, just before the charge, to form a thin facing over the tap hole opening.

● "We're having plenty of trouble with hard taps. As a result, we're losing time and some of our alloy additions," complained a furnace superintendent to a Basic Refractories Field Engineer. What could he suggest?

This particular Basic Engineer is a veteran steel man. For more than 40 years he has lived with open hearths and electric furnaces. He immediately suggested a way to eliminate the hard taps.

Here is the method: First, the tap hole is filled as usual with mixed raw and burned dolomite. Then *just before the charge*, it is faced thinly with Basifrit, thoroughly soaked with water. This thin facing sets rapidly and safely seals the tap hole opening. The Basifrit seal is not gummy and does not take iron, It gives the second helper a feeling of safety when digging out. Yet it is not so heavy as to be difficult to break through with a rod.

This simple suggestion by a Basic engineer has ended many cases of trouble with hard taps, has cut down delay time and reduced alloy losses. It is typical of practical recommendations offered by Basic service men in their everyday work.

Think of Basic Field Engineers as *your* refractories service men. Their job is to help you get the best out of good refractories — to make those refractories contribute to greater production for war.

BASIC REFRACTORIES FOR THE STEEL INDUSTRY

MAGNEFER—Dead-burned dolomite for hearth and slag line maintenance.
SYNDOLAG—Dead-burned, rice size dolomite for maintenance.
BASIFRIT—Quick-setting magnesia refractory for new construction, resurfacing and maintenance.
OHIO MAGNESITE—Domestic dead-burned high-magnesia grain refractory, equal to Austrian.
685 PLASTIC—Strong plastic basic refractory for hot and cold repairs.
RAMIX—An air-setting, time-saving basic refractory for rammed hearths and cold repairs in open hearth and electric furnaces.
GUNMIX—A basic refractory for maintenance of furnace walls, sized for use with a cement gun.
HEARTH PATCH—For deep hole patching and other quick repairs in the basic open hearth.
RAW DOLOMITE—Washed open hearth dolomite in rice size and standard ½-inch.

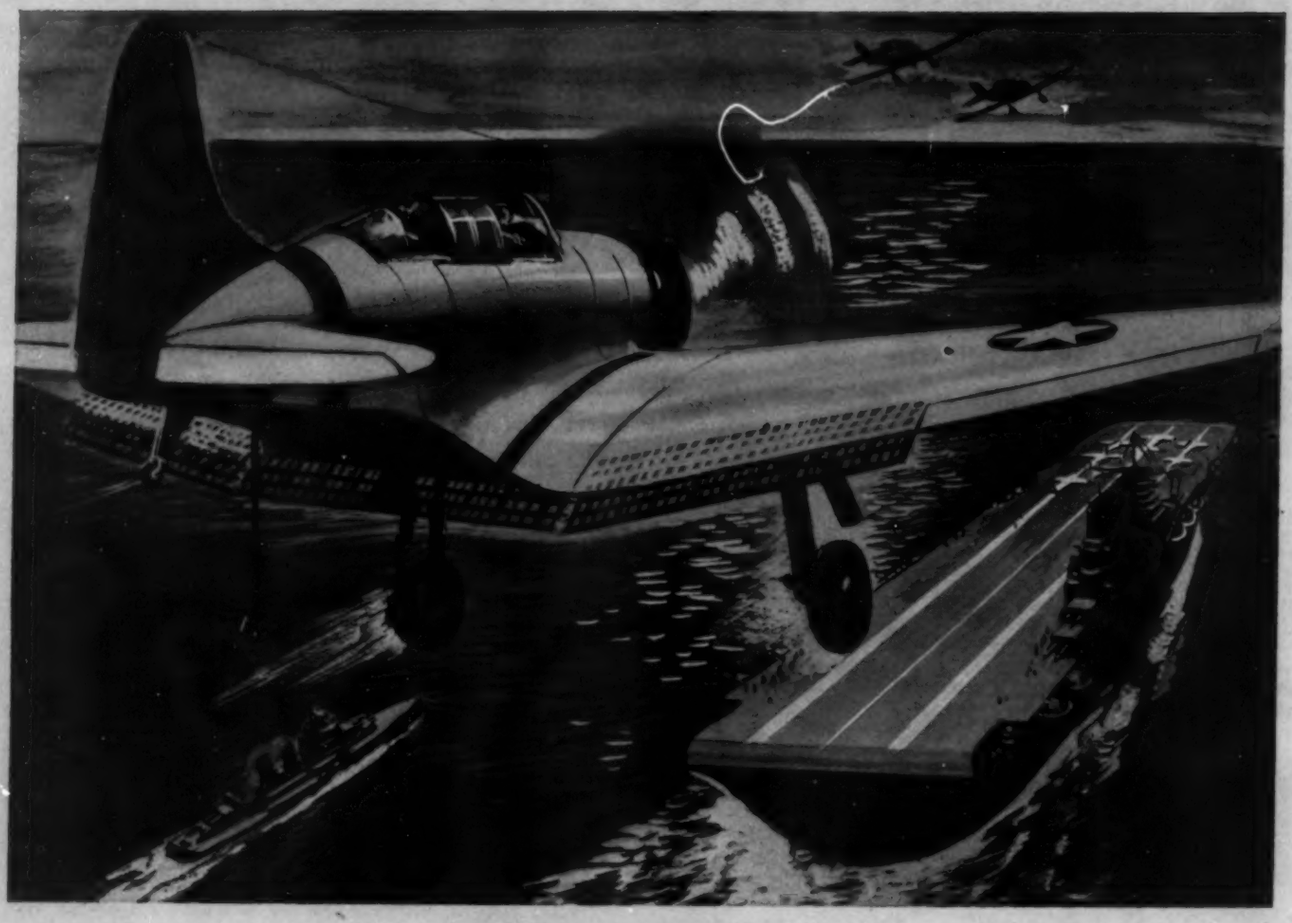
BASIC REFRACTORIES INCORPORATED

FORMERLY BASIC DOLOMITE, INC.

CLEVELAND, OHIO

Happy Landing

ON A FLAT-TOP



with N-A-X *9100 Series Alloy Steel*

In many a dive-bomber that roars in for a three point landing on an aircraft carrier, the flying skill of the pilot is supported by the steel-making skill of Great Lakes metallurgists. For N-A-X 9100 Series of Alloy Steels meets the exacting requirements of steel users in the manufacture of airplane landing gears, wheels, and other parts.

N-A-X 9100 Series is easily adapted to a wide variety of other applications and it responds successfully to all treatments. N-A-X 9100 Series is being used as (1) a High Tensile Grade; (2) a Medium and Deep Hardening Carburizing Grade; (3) a Medium and Deep Hardening Constructional Grade. Deep hardening characteristics are greater than, or equal to, the higher alloyed steels. No sacrifice of toughness or machinability is made in the N-A-X 9100 Series.

In addition, the use of N-A-X 9100 Series *conserves critical alloying elements*. For in this versatile steel all strategic elements are held to an absolute minimum—yet quality is maintained. N-A-X 9100 Series is supplied in two general grades, with and without molybdenum, all other components of the analysis being held constant.

GREAT LAKES STEEL CORPORATION

Detroit, Michigan

Sales Offices in Principal Cities

Division of

NATIONAL STEEL CORPORATION

Executive Offices · Pittsburgh, Pa.

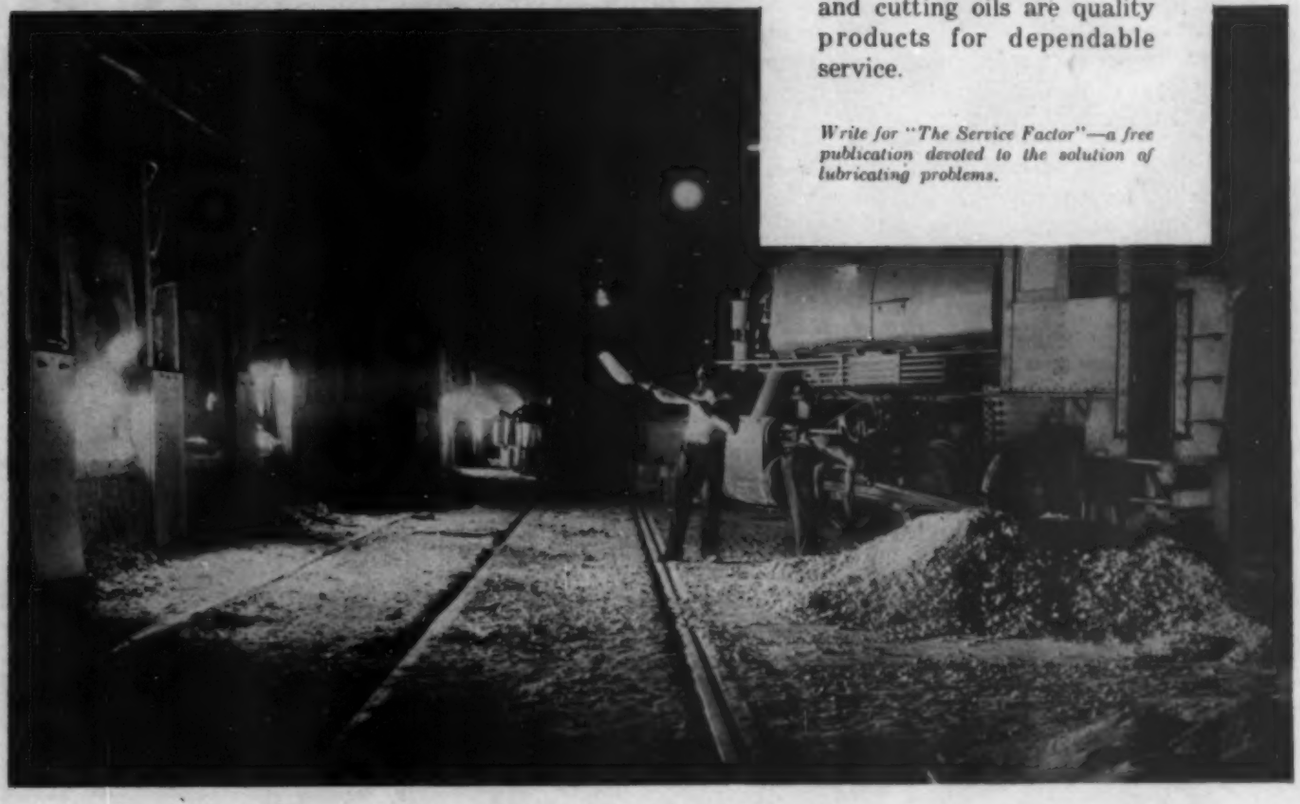
SCRAP IS VITAL TO STEEL PRODUCTION . . . GET YOURS IN FOR VICTORY!

SECOND FRONT STRATEGY needs home front strength. For maintenance of capacity operation and necessary conservation of equipment in *STEEL MILLS* use . . .

. . . . . SINCLAIR LUBRICANTS . . .

Sinclair roller bearing greases, oils for circulating systems, and tempering, quenching and cutting oils are quality products for dependable service.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



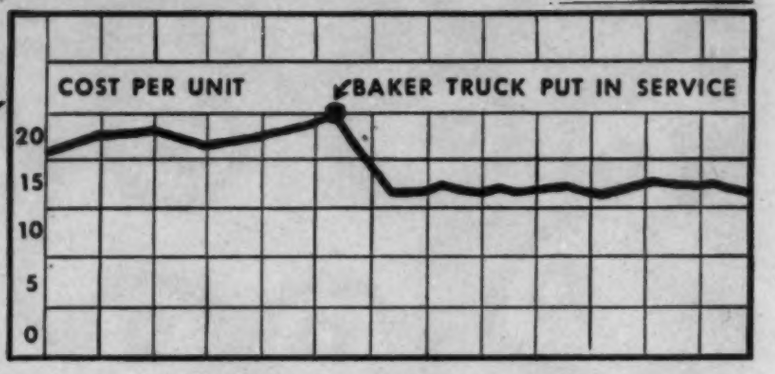
SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago · 10 West 51st Street, New York City · Rialto Bldg., Kansas City · 573 West Peachtree Street, Atlanta · Fair Building, Ft. Worth

BAKER TRUCKS *can help you to* CUT PRODUCTION COSTS



Here's how—

1. REDUCING RENT COST
By tiering in warehouse and by putting every foot of space in plant and yard to use, Baker Trucks cut rent costs, and often eliminate need for plant expansion.

2. CUTTING MACHINE AND LABOR COSTS
They can step up rate of output per man and per machine in most plants.

3. CUTTING HANDLING COSTS
Cost of moving materials is a definite part of production cost and can be reduced substantially

4. CUTTING SPOILAGE COSTS
Smooth and efficient operation of Baker Trucks reduces damage to materials in the plant and in transit.

* * *

The BAKER Material Handling Engineer Can Help You

He knows how to bring your material handling to maximum efficiency, speeding plant production and cutting manufacturing costs to a minimum. He is at your service.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker Raulang Company
2167 West 25th Street • Cleveland, Ohio

5. CUTTING TIME COSTS
General reduction in production cost can be effected by saving man-hours from raw material to delivered product, by handling with Baker Trucks.

6. CUTTING LOSS OF TIME THROUGH ACCIDENTS
By eliminating heavy, hazardous manual lifting, they improve plant safety and reduce costly accidents to man-power.

7. CUTTING DIE HANDLING COSTS
The changing of dies, patterns and other machine equipment is speeded with Baker Trucks. Handling and storing these items are also done more efficiently.

Baker INDUSTRIAL TRUCKS

In Canada: Railway and Power Engineering Corporation, Ltd.

You'll get better forging production—less hammer down-time if you use tough, Hardtem Die Blocks, because they are scientifically forged from Heppenstall's own specially manufactured acid open hearth, alloy die block steel, then heat treated by the exclusive Hardtem process. Hardtem die blocks require no further heat treatment, can be repeatedly resunk without annealing.

Without any obligation to you, Heppenstall Service Engineers will gladly add their experience to yours and help you solve die block problems. Call on them. And next time you order, specify Heppenstall. Use tougher die blocks that machine easier and stay in the hammer longer. Write for full information, Box S12, Heppenstall Company, 4620 Hatfield St., Pittsburgh, Pa.

Heppenstall

PITTSBURGH DETROIT BRIDGEPORT

HEPPENSTALL H QUALITY

Forging Fine Steels for More Than Fifty Years

BOB MARTIN, STEEL SALESMAN,
YOUR STEEL SUPPLIER
R.C. MARTIN
Sales Representative
—and scrap expediter
USS
UNITED

IS NOW A *Scrap Expediter!*

American steel producers and steel warehouses are mobilizing their sales personnel to help you do a 100% job of getting in the scrap

WE'VE called him Bob Martin for short. He may be a U·S·S salesman, or he may represent some other steel supplier. In any case, it's his job to help you get the steel you need for war production when you need it. Things being what they are, that's a tough assignment in itself.

But now Bob Martin and many of his fellow salesmen have another war job. They've been made scrap expediters, too! The grave need for more scrap to produce more steel calls for unprecedented action. That's why the Steel Industry has joined forces with the War Production Board to make a thorough, continuous canvass of America's industrial scrap resources in the plants of steel consumers.

So don't be surprised if the next steel salesman who calls at your plant asks first how he can assist your scrap drive. His experience equips him to help you do the best possible salvage job. And he has been given special information by the WPB to make his efforts tie in closely with the Government's salvage program.

How a Steel Salesman Will Help to Expedite Your Scrap Drive.

On his new job as a scrap fieldman, in cooperation with the WPB, the steel salesman assigned to your plant will:

1. Call on a principal executive. Explain the WPB Dormant Scrap Drive objectives, and ask for your active and immediate cooperation.
2. Help, in doubtful cases, to identify dormant scrap, such as obsolete machinery, tools and equipment which are useless to war production because they are broken, worn out or not repairable.
3. Assist in facilitating the disposal of dormant scrap.

The need for scrap is URGENT! By December 31, 1942, an inventory of 7,000,000 tons must be made available to steel mills. Do *your* part by helping the steel salesman to do *his* part in this all-important drive.

HELP FOR YOUR SCRAP DRIVE

Inform your employees by showing the new sound slide film, "Let's Get in the Scrap." We'll be glad to lend you a print. Write to United States Steel Corporation, Room 1637, 436 Seventh Ave., Pittsburgh, Pennsylvania.

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York* • CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago* • COLUMBIA STEEL COMPANY, *San Francisco* • NATIONAL TUBE COMPANY, *Pittsburgh* • TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham* • SCULLY STEEL PRODUCTS COMPANY, *Chicago, Warehouse Distributors*

STATES STEEL

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& Heintz, Inc. • John Deere Harvester Co. • Koppers Co.-Ba
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• Chrysler Corp. • Cleveland Pneumatic Aerol, Inc. • The Cleveland Tractor Co. • Coleman Motors Corp. • Delco
Corp. • Bethlehem Steel Co. • Buda Co. • Continental Motors Corp. • Fairbanks, Morse & Co. • Norfolk Navy Yard • Oliver Farm Equipment
• Link Belt Ordnance Co. • Massey-Harris Co., Inc. • Nordberg Mfg. Co. • Pontiac Motor Div. • Porter-Bland Steel Co. • Pratt & Whitney Co. • Pratt & Whitney Div. • Pratt & Whitney Tool Co. • Pratt & Whitney Tool Co. • Pratt & Whitney Tool Co

How you can save on Diamond Wheels!

TYPICAL COMPARATIVE DIAMOND WHEEL COSTS

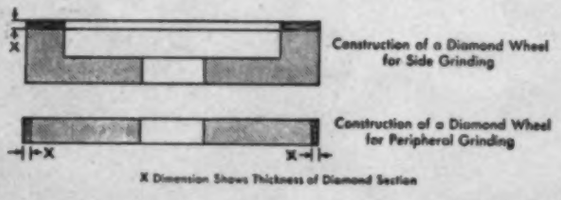
	Depth Diamond Section	Cost per Wheel	Number Wheels Required for Equal Service	Total Cost for Same Amount of Grinding Service	Saving Resulting from Using Thicker Section
TYPE D6W CUP WHEEL					
Diamond in Rim			4	$254.20	
6" x ¾"—¾" Rim	1/32"	$63.55	1	184.65	$69.55
100 Concentration	⅛"	184.65			
	1/16"	63.55	2	127.10	
Same Wheel	⅛"	103.90	1	103.90	23.20
50 Concentration					
TYPE D1T STRAIGHT WHEEL					
Diamond in Periphery			4	120.20	
6" x ⅛"	1/16"	30.05	1	73.80	46.40
100 Concentration	¼"	73.80			

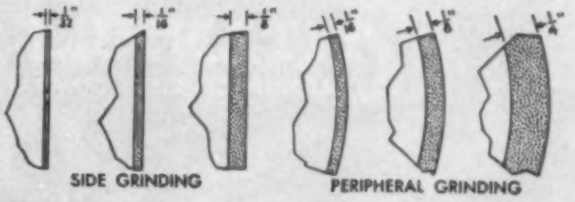
● The thickness of the diamond, or grinding, section of standard diamond wheels varies from 1/32 to ¼ inch. Actually it is better economy to use the thicker sections wherever possible. A ⅛ inch section, for instance, contains four times as many carats of diamonds as the thinnest section, and does four times the work. But the cost of one ⅛ inch section is far less than its equivalent of four 1/32 inch sections.

Why? Because in the first instance you pay for only *one* basic wheel shape, or "preform" and in the second you pay for four! Thus you save money by specifying the thicker diamond sections. The table above shows actual savings in a few typical cases.

By buying wheels with thicker diamond sections you save more than your *own* money. You also help conserve essential war materials and labor.

We urge you to take advantage of this saving, and thus also cooperate with us in conserving time and materials vital to our mutual war effort.


Construction of a Diamond Wheel for Side Grinding
Construction of a Diamond Wheel for Peripheral Grinding
X Dimension Shows Thickness of Diamond Section



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ABRASIVE PRODUCTS

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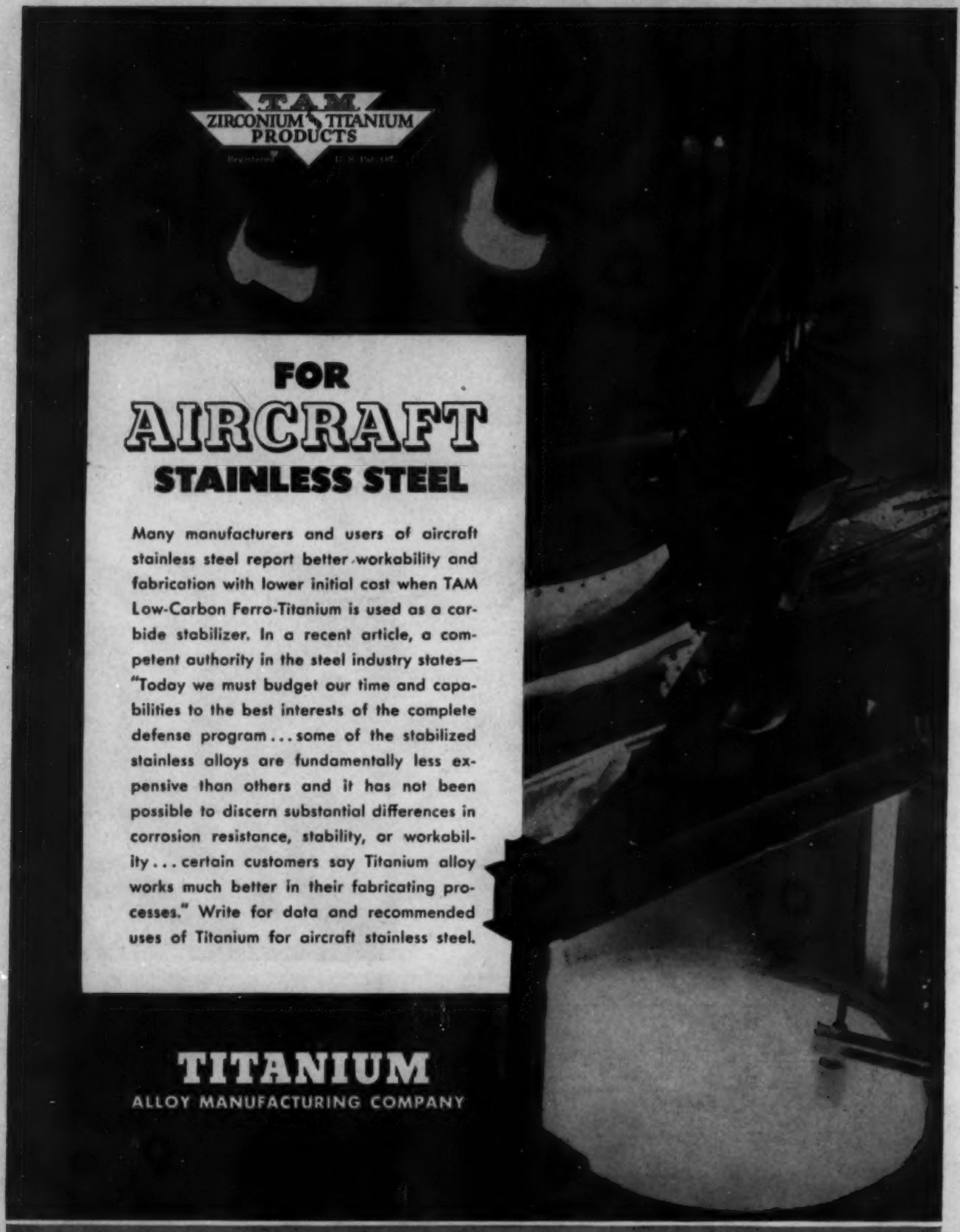
REG. U. S. PAT. OFF.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company)



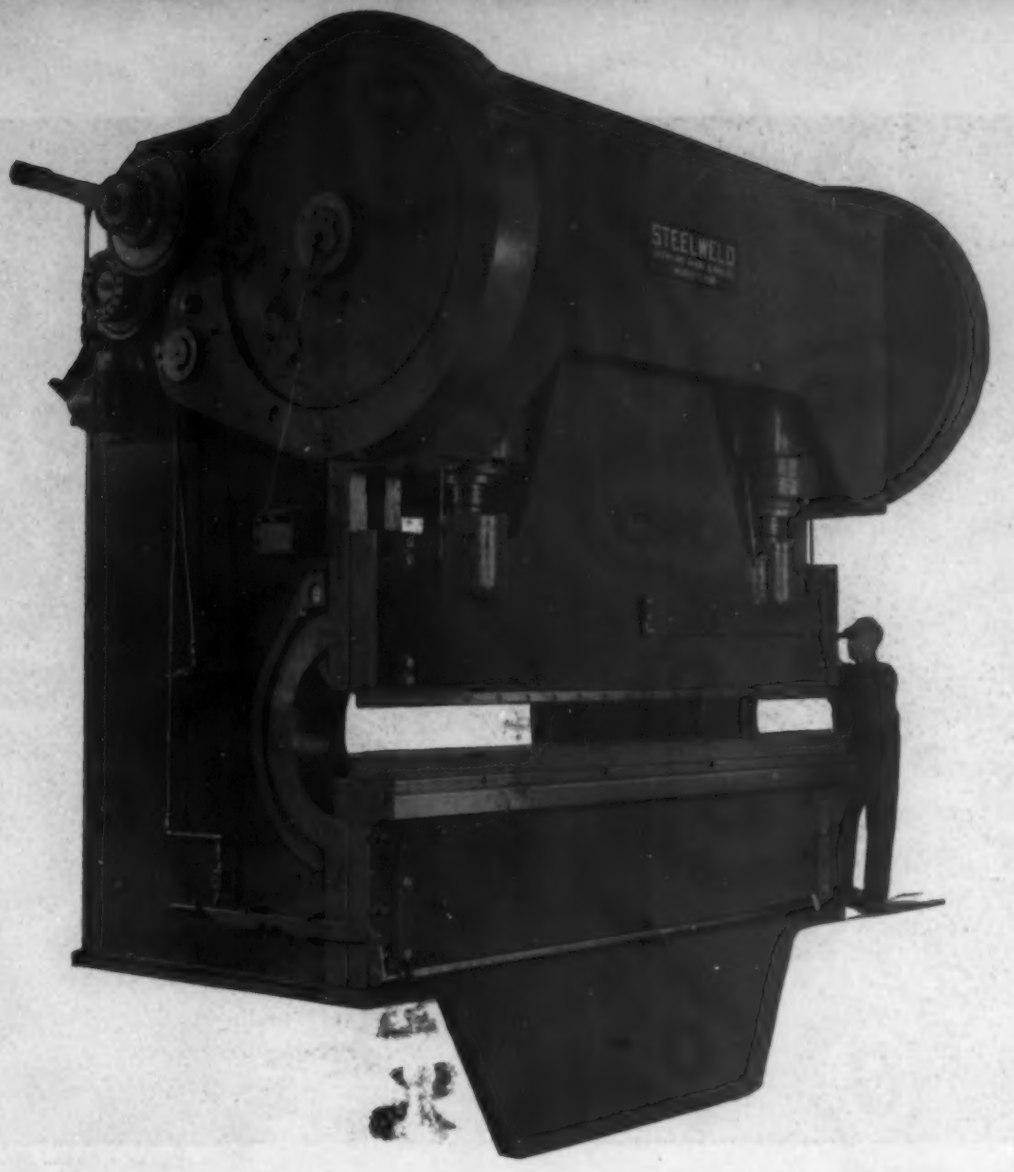
FOR
AIRCRAFT
STAINLESS STEEL

Many manufacturers and users of aircraft stainless steel report better workability and fabrication with lower initial cost when TAM Low-Carbon Ferro-Titanium is used as a carbide stabilizer. In a recent article, a competent authority in the steel industry states—"Today we must budget our time and capabilities to the best interests of the complete defense program... some of the stabilized stainless alloys are fundamentally less expensive than others and it has not been possible to discern substantial differences in corrosion resistance, stability, or workability... certain customers say Titanium alloy works much better in their fabricating processes." Write for data and recommended uses of Titanium for aircraft stainless steel.

TITANIUM
ALLOY MANUFACTURING COMPANY

GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.

EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY



TEN feet of one-inch plate can be bent cold with this model P6½-10 Steelweld Bending Press. Three-inch high-tensile heat-treated armor plate can be straightened with it.

Like the entire line of Steelweld Presses it has a one-piece all-welded frame that will remain rigid for life. Because of shipping limitations the bed is bolted to the frame with heavy shear pins taking the working load.

Shafting and machinery are located at rear of the machine, preventing damage from bent-up plates and crane hooks.

Clutch and brake mechanism is electrically operated to reduce fatigue of the operator and speed operation.

Gears are high carbon, heat-treated. Bearings are extra large. Anti-friction bearings are pressure-grease lubricated. Other bearings are automatically oil lubricated.

A tonnage indicator is provided to keep both operator and management informed of the loadings to which the press is subjected.

The P6½-10 and all other Steelweld Presses are equally adaptable to the production of materials of peace or war.

THE CLEVELAND CRANE & ENGINEERING CO.
STEELWELD MACHINERY DIVISION
1125 EAST 283RD STREET • WICKLIFFE, OHIO.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

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CATALOG No. 2002 gives complete construction and engineering details. Mail request for free copy on your company letterhead.

STEELWELD
BENDING PRESSES

GENERAL SALES AGENTS: CYRIL BATH & CO., E. 70TH & MACHINERY AVE., CLEVELAND

Photo courtesy of Popular Photography

HOW MUCH MATERIAL CAN YOU *Save?*

Save Manpower, too

The National Safety Council is authority for the statement that 460 million man-days were lost through accidents in this country last year. That's enough time to supply an army of 200,000 with full fighting equipment. Remind your employees to play it safe *all the time*—on the job or away from it. Casualties on the home front are every bit as damaging as on the fighting fronts.

THE problem is simple to state. The nation's supply of essential materials must be made to go farther—particularly the vital alloy steels. More must be done with less.

Nosing out the scrap—the idle or dormant metal—is highly necessary, but it's only half the answer. The other half lies in using *new* alloy steels more efficiently—checking machine set-ups and plant procedures to reduce rejects, spoilage and undue scrap—using lower alloys wherever possible—plugging every loophole of waste.

Scrap the old steel, conserve the new; that's the only way the nation can secure a greater yield of war equipment for every ton of alloy materials taken off the national stockpiles. If we can help you save, through any printed or personal assistance, call on us.

Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

A-8678 . . . W & D

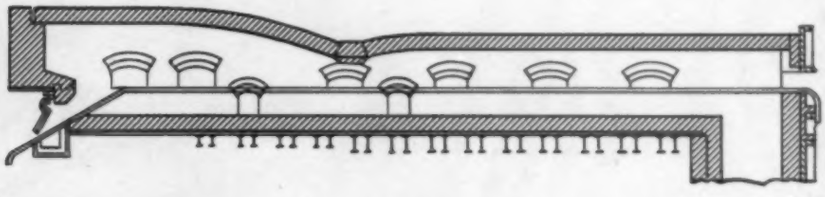
TO BEST SERVE THE WAR EFFORT . . . MODERNIZE AND IMPROVE EXISTING FACILITIES

Here's Proof—

that BLOOM ENGINEERING plus BLOOM EQUIPMENT

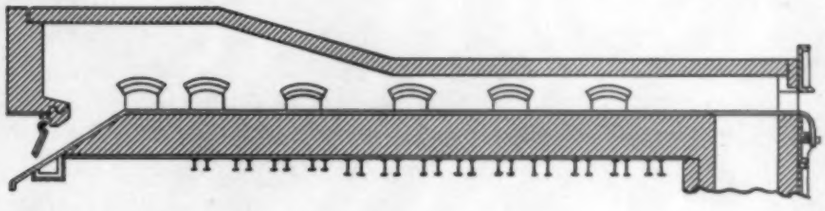
INCREASES FURNACE OUTPUT REDUCES FUEL CONSUMPTION

1



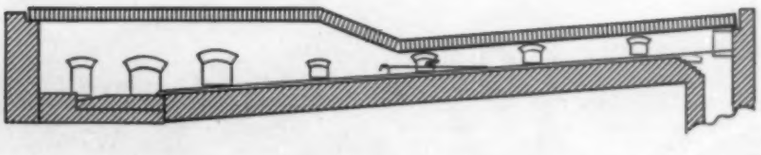
● Production was doubled and fuel consumption reduced 40% when a furnace of this type was re-equipped by Bloom Engineering (change-over took less than seven-days!) Present heating rate—160 lb. steel per sq. ft. per hour.

2



● Several furnaces were converted from water-cooled skids to the solid hearth type shown here, and equipped with Bloom burners. After the change they heated 30% more steel with 50% less fuel. Only two weeks shut down was needed to make the complete change-over.

3



● Bloom Burners in this type of furnace have produced these creditable results:

1. Low Decarburization.
2. Heating rates of 130 lb. per sq. ft. per hour.
3. Fuel consumption as low as 1,200,000 Btu. per ton monthly average with cold air.
4. Fuel consumption less than 1,000,000 Btu. per ton with preheated air.

BLOOM

ENGINEERING COMPANY

916 BEHAN STREET . . . . . PITTSBURGH, PA.

Are You Wasting

30 to 40% of your weld

ON VERTICAL FILLETS

WASTE

On vertical fillets, you may be wasting as much as 40 per cent of your weld metal as shown by the poor contour above. This may be due to one or more of the following conditions:

★ Arc length too short

★ Electrode too large

★ Low travel speed

★ Excess current, causing metal to run out

★ Wrong type of electrode for the job

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

★ Use arc voltage recommended by the electrode manufacturer

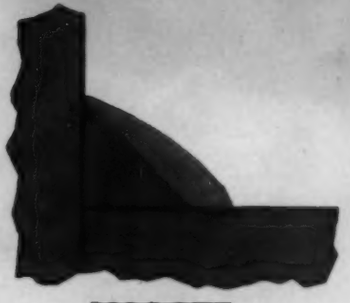
★ Use smaller electrode, which, however, should be as large as plate thickness will stand but not larger than $\frac{1}{32}$- or $\frac{3}{16}$-inch in diameter

★ Speed electrode travel

★ Use lower current

★ Change to type of electrode better suited for this type of joint

ON HORIZONTAL



WASTE

On horizontal fillets, you may be wasting as much as 30 per cent of your weld metal as shown by the poor contour above. This may be due to one or more of the following conditions:

★ Electrode held at wrong angle

★ Electrode too small for size of fillet

★ Excess current, causing metal to run down

★ Arc length too long—or too short

★ Low travel speed

★ Wrong type of electrode for this type of joint

TRAIN OPERATORS FASTER with the G-E training film "THE INSIDE OF ARC WELDING"

This new training film, in full color and sound, helps welding instructors give individual instruction to large and small classes alike. It is made in six parts (16 mm), each part complete in itself—1. fundamentals; 2. flat position; 3. horizontal position; 4. alternating-current; 5. vertical position; 6. overhead position. More than 2000 reels are already in regular use.

YOU CAN BUY these films at print cost—only $52 per part; $312 for the set of six. YOU CAN BORROW prints for a single showing. Just contact your G-E distributor or local G-E office, or write to General Electric Company, Schenectady, New York.

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metal ?

Arc welding speeds ship construction, conserves steel, and, through reduction of dead weight, increases cargo capacity and cruising range.

FILLETS

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- ★ Hold electrode at angle recommended by the manufacturer
- ★ Use larger electrode, but not more than ¼-inch in diameter
- ★ Use less current
- ★ Use arc voltage recommended by the electrode manufacturer
- ★ Speed electrode travel
- ★ Change to type of electrode better suited for this type of joint

The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment.

Proper Technique and G-E Rods Can Net Large Savings

ARC-WELDING operators throughout industry are conserving valuable raw material by increasing the production they get from each electrode through improved technique. To accomplish this saving, operators should have electrodes which strike easily, which have high deposition efficiency and usability, and which are fully approved for their individual applications. G-E rods meet all these requirements. *General Electric, Schenectady, N.Y.*

GENERAL ELECTRIC

THE QUICKEST WAY TO SPOIL GOOD BROACHES . . .

. . . Lean them against each other in a corner

How to get more production with your Broaches------

1. BY PROPER HANDLING

IT TAKES time to recondition a damaged broach. Careless handling of your broaches may tie up production. Here are a few good rules to follow to protect these vital war tools:

(a) Always provide individual storage racks for broaches. These should either be of a material that will protect the teeth from damage or else should be lined with such material. If cutting edges of broaches are allowed to strike against each other they may be chipped or nicked.

(b) Never drop a broach on any hardened surface. Broaches are usually made of high speed steel and may even be tipped with tungsten carbide. You may chip, nick, or even break the teeth.

(c) When broaches are to be stored for any period of time they should be treated to protect them against corrosion.

(d) Equipment for moving broaches from one department to another should have separate compartments to prevent nicking of broach teeth.

COLONIAL broaches are designed to enable you to machine your parts more accurately, quicker, and at a lower tool cost per piece than with virtually any other method of stock removal. Give them a chance to do an all-out job for you. Handle them carefully.

colonial BROACH COMPANY

Broaching Machines — *Broaches-Broaching Equipment*

DETROIT . . . . U. S. A.

Chip-handling system at Wright Aeronautical gathers tons of scrap without hindering operations, p. 84

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Help Them Win...Turn in Your SCRAP!

Scrap is steel or iron useless in its existing form but valuable as *raw material* for remelting. Since it is already refined, more scrap in the furnace charge speeds up the refining process and enables steel to be turned out faster for implements of war... More scrap—*from your plant*—means more steel.

Conservation Authorities Recommend the Following 8 Steps

1. Put some one individual in charge of scrap in all departments of your business and GIVE HIM AUTHORITY TO ACT.

2. Comb the plant and yards for dormant scrap, abandoned equipment, old boilers, pipe, moulds, obsolete dies and parts, material now being destroyed which has salvage value.

3. Survey all plant equipment, particularly idle standby or discarded machines, with a view to applying or converting them to useful production.

4. SEGREGATION: Identify, classify and segregate scrap and supervise its handling to avoid contamination. This will increase its value. Provide separate containers, clearly marked for each class of scrap material.

Repair or rework worn or broken cutting tools. Keep unusable small pieces and turnings segregated. Even high speed steel grinding dust is valuable.

Dismantle discarded equipment promptly into its components — electrical, fastenings, lumber, etc. — so that these parts may be utilized or scrapped.

Sort blanks, short ends, cut-downs, clippings, etc., for possible reuse for smaller parts made in the same or other departments.

Recover and reclaim used cutting oils, lubricants, surplus paints and spray finishes.

Sort sweepings and miscellaneous waste to recover scrap values.

5. Constant reminders in the form of posters, illustrations of right and wrong methods, pay envelope enclosures, house organ publicity, etc., are potent aids to the conservation program.

6. Release for scrap, obsolete engravings, electrotypes, and standing types for catalogs, forms and advertising material.

7. Inspect all refuse to detect avoidable waste and excessive rejections. Educate production executives to correct such conditions at the source.

8. For information and assistance on special phases of conservation and salvage communicate with Industrial Salvage Section, Conservation Division, War Production Board, 9th Floor, Washington Gas Light Building, Washington, D. C., or with nearest regional office.

The metallurgical experience of our technical staff is available to aid you in these and other technical phases of metal salvage.

KEEP SCRAP MOVING INTO WAR PRODUCTION!

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

HIGHLIGHTING

this issue of STEEL

RAW MATERIALS Great Lakes iron ore shipments already have passed the previous season's record (p. 26) and will set an all-time peak of about 92,000,000 tons. Shippers doubt that any post-season activity will be necessary to supply an adequate tonnage for all war needs. Government-financed beneficiation plants to concentrate Mesabi ore-bearing rock will be necessary (p. 26) if we are to be assured of lake ore after 1950. . . National scrap campaign, sponsored by the newspapers, resulted in the collection of 3,000,000 tons of old materials—two-thirds of one month's supply at recent rate of consumption. Probabilities are that the tonnage will be increased substantially when complete returns are known (p. 30). Steel warehouses now are leading a new drive to bring dormant industrial scrap to the mills. . . Sponge iron, long a controversial subject, will be produced experimentally (p. 31) in a plant to be constructed in Youngstown with government financing.

WASHINGTON Rationing, unpopular by-product of the war, is presenting some tough problems (p. 36) for OPA officials. Extension of the system is regarded as inevitable. . . In the belief that the country must not be allowed to emerge from the war without a definite plan for converting back to peacetime pursuits, many corporations (p. 37) are working out long-range programs. . . Durable goods industries practically ceased production of nonmilitary items by the end of summer. August total of unfilled orders (p. 40) reported by 3021 plants was $26,000,000,000, 91.2 per cent of which was scheduled for war purposes. . . . Edwin H. Brown, an engineering vice president of Allis-Chalmers Mfg. Co., Milwaukee, has been appointed assistant chief of WPB's Iron and Steel Branch in charge of the Plant Facilities Section, succeeding Don N. Watkins who resigned.

TANKS, PLANES Official opening of the Army's new tank-automotive center in Detroit is described in Mirrors of Motordom (p. 43), and the resulting temporary dislocation in the flow of heavy ordnance equipment explained. The "Detroit plan for vertical cartels" to control material distribution, is gaining support. . . Major Seversky replies to a rebuke by designer Don Berlin by pointing out that his quarrel "is only with those in high places who set unrealistic conditions to be met by designers and the industry," in Wing Tips (p. 46). . . More emphasis is to be put on the production of aircraft, with air power "the key to final victory"—a machine tool builder and former WPB official informed gearmakers in their semi-annual convention (p. 51). . . Bullard Co. employes (p. 49) buy a Thunderbolt fighting plane for the Army Air Forces.

PRODUCTION Production Requirements Plan certificates carry no assurance of fourth quarter steel deliveries as capacity on some products is more than covered by directives. Some cancellations are resulting (p. 109). . . . More than 61,000 steelworkers had entered the armed forces up to the middle of the year (p. 31), nevertheless, steel production has been increased substantially. . . Farm equipment production has been limited to 20 per cent of 1940 output (p. 32) and its manufacture concentrated in the smaller plants, thus permitting the larger plants to devote capacity to direct war *materiel*. Repair parts quota is fixed at 130 per cent of 1940 output.

TECHNICAL Case hardening of important machine parts has been greatly accelerated by the ni-carb process, says Reginald Trautschold (p. 64) describing typical work handled and equipment employed. . . Hammered resistance welding combines welding and forging processes to produce good welds without flash or fin and with low power consumption (p. 76). Originally developed for making pipe from strip wound spirally, the process appears to have many important possibilities.

Otto de Lorenzi outlines some of the important factors in designing a well-balanced steam generating unit in the concluding portion of his discussion on steam generation with available fuels (p. 80).

J. H. Goss tells how an effective quality control system was employed to cut rejects 90 per cent. The same methods (p. 92) could well be utilized as the basis for other production control systems. He states the complete sequence of operations, from setting up the system to its application and results.

CONSERVATION Professor Macconochie in Section VII of the series on conservation and substitution in ordnance work analyzes our position as to aluminum supplies and world production. He relates what is being done to conserve aluminum in ammunition and combat vehicles (p. 66). He points out "aluminum is not scarce—we merely require vast quantities". . . An exceptionally efficient chip handling system that reclaims various types of steel as well as aluminum, magnesium, brass and bronze is described by Mark E. Nevils (p. 84).

Proper scrap metal segregation avoids loss of valuable alloys.

Irreplaceable Alloys Lost to War Program

Metallurgists Aid Needed

Metallurgists can give invaluable assistance to America's total war effort if they will help prevent the loss resulting from mixed alloy scrap. "Scrambled" scrap is never an advantage to steel mills, and it takes from war industries great quantities of scrap and irreplaceable alloys.

In many American plants segregating and classifying scrap is a co-ordinated effort by metallurgists, the design department, operating heads, supervisors, and the machine operators. New men are carefully instructed on the importance of segregating various kinds of scrap—tote boxes, designated by name and color, are removed from machines whenever a new run calls for a different kind of steel. Specially marked bins are used to accumulate quantities suitable for unit shipments. Whenever there is doubt about any scrap, it is checked by rapid qualitative tests.

Nickel-bearing scrap salvaged in twelve months in one plant contained 110,000 lbs. of pure nickel—another shop saved 75,000 lbs. of nickel and 35,000 lbs. of chromium.

You, with your knowledge of alloys and alloy steels, can advance the war program by rechecking scrap segregation methods to make certain that no precious alloy is lost.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATE • STRUCTURALS
PILING • RAILS • TRACK ACCESSORIES • REINFORCING BARS

Dedicated to Victory

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City

STEEL
October 26, 1942

Our Rare Privilege Nov. 3

Next week millions of Americans will go to the polls to vote. They will elect representatives to Congress and to state legislatures as well as state and local officers. In many communities they will decide local issues.

Practical politicians complain that the public is apathetic to the approaching elections. This is due partly to the traditional habit of the people to be less concerned with "off-year" elections than with the national elections held every four years. Another factor is that many persons are busy on war work and may feel that it takes precedence over the casting of one's vote.

This attitude is unfortunate, because the elections of Nov. 3 take on more than usual significance owing to the extraordinary circumstances of this period. There are compelling reasons why every individual should feel it is his patriotic duty to vote next week.

First, the mere right to vote is a rarer privilege today than it has been in many generations. We live in one of the few large industrial nations in which the individual still may have a free voice in the affairs of government. Secondly, we need good representatives in government as we have never needed them before. The men and women we elect to the House of Representatives will influence the attitude of that body in the conduct of the war, in the shaping of the peace and in the directing of the nation's postwar economy. It is not too much to say that their influence will be felt in the kind of lives we live after the war.

Every industrialist not only should plan now to vote but also should use his influence to awake others in his community to the importance of this election. Think what tens of millions of persons in Europe and Asia would give for the right which is ours on Nov. 3!

E. L. Shaner

Editor-in-Chief

1942 Shipments To Exceed Record by 10,000,000 Tons

Season's movement to approximate 92,000,000 tons. Post-season shipping probably will be unnecessary, although precautions for emergencies have been taken

WHEN the history of the present World War is written, one chapter must be devoted to the achievement of the Great Lakes iron ore fleet, which this year will exceed all previous records by at least 10,000,000 tons.

Last year's record of more than 81,000,000 tons already has been broken, and indications are that 92,000,000 tons of ore will be moved.

Shippers and ore mine operators have kept pace with constantly increasing estimates of the tonnage to be required. Numerous time-saving devices have been inaugurated to keep the vital war material moving down the lakes.

As a result the fleet by the close of the season will have moved all the ore that is required, all the ore than can be stored at lower lake ports and furnaces.

Vague suggestions emanating from Washington that the shipping season be extended through the winter, or at least for a considerable period after normal closing, are taken lightly by shippers. While ice breakers have been provided for late autumn emergencies, and are welcomed, these men point out that the bottleneck in iron ore shipments is not ice but frozen ore. Ore that must be thawed by steam injections at the upper lakes freezes more solidly on the trip down and requires an immense amount of effort to thaw at unloading docks.

Also to be considered in post-season shipping is the probable loss of vessels. Officials of the Office of Defense Transportation recognize the folly of risking a ship to bring down possibly 10,000 tons of ore when the ship may be wrecked, losing thereby potential transportation for 300,000 tons in 1943.

To avoid these risks the ore people have exerted extraordinary effort and by the end of the normal shipping season probably will have an adequate stock of the mineral on the lower lakes.

As of Oct. 19, shipments amounted to 79,286,450 gross tons, not including those from Michipicoten for October. In the first 18 days of October, 6,844,997 tons were shipped from United States ranges, and the estimates for the month range between 11,300,000 and 11,400,000 tons.

Federal-Financed Concentrating Plants "Essential to Future Supply"

Known high-grade iron ore reserves in the Lake Superior district will be exhausted, at war production rates, in 1950, but unless concentration plants are built to beneficiate low-grade ores presently unusable, a shortage may be expected to develop several years earlier.

Construction of the concentration plants would require government financing, as the ore mining industry itself cannot be expected, under existing conditions, to take the risk of investing the funds necessary for the large scale production of taconite (ore-bearing rock underlying the Mesabi range in great quantities) concentrate and underground ore. As long as the less expensive open pit ore is available, the production of concentrates and any large tonnage of underground ore from the Mesabi range in privately financed and operated plants and mines is uneconomical.

These views were expressed by E. W. Davis, director, Mines Experiment Station, University of Michigan, Minneapolis, in a recent report to WPB.

Mr. Davis recommended, to insure adequate ore for the war effort and to conserve as much of the open pit, direct shipping ore as possible, that the following steps be taken:

By the federal goverment: (1) Offer long-term loans, without interest, to mine operators to be used in providing facilities for the production of underground ore and taconite concentrate; (2) Guarantee a market for the new ore and a sales price sufficient to cover the reasonable cost of production.

By the state of Minnesota: (1) Modify the ad valorem tax to correct for the adverse effect that it exerts on the production of open pit, direct shipping ore; (2) Take the proper steps to modify the leases on open pit ore properties so that they do not exert pressure on the mining industry that is contrary to the best interests of the public.

Mr. Davis outlined a program (see Chart 3) which if carried out would assure an adequate supply of ore until 1954 at wartime rates. If the war ends sooner, he explained, mining of open pit ore could cease almost immediately and what remains of it could be conserved for abnormal demand periods which may occur in the future.

50,000,000 Without Open Pits

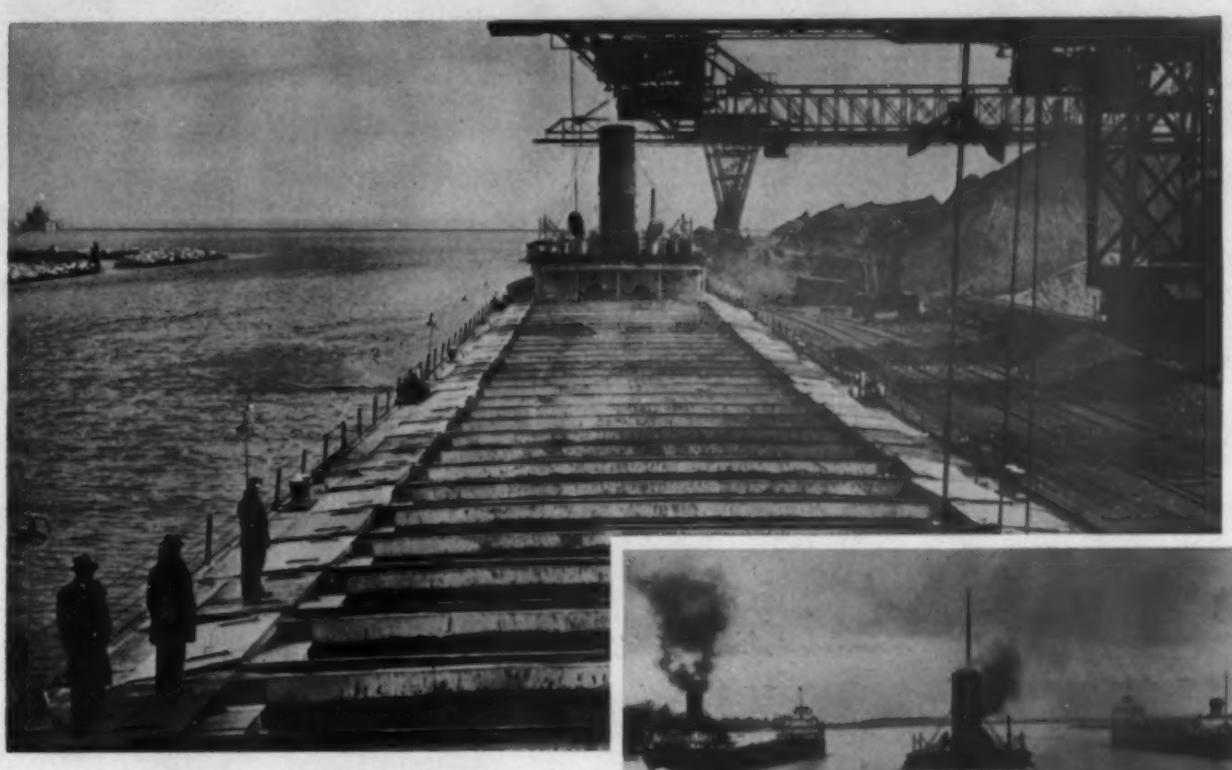
The program contemplates the gradual increase in the production of the Mesabi underground ore and taconite concentrate until a normal production of 50,000,000 tons could be maintained without use of any open pit ore.

Rate of production in the Cuyuna, Vermilion and Michigan-Wisconsin ore would not be increased above the output projected in Chart 1, but the producing life of these districts would be increased materially. Reason for not increasing the production rate is the difficulty and great expense necessary.

Production rate of Mesabi underground ore would be increased substantially and it is believed a rate of 12,000,000 tons a year could be achieved and maintained for many years. This would mean that a large number of underground mines would be put into operation. This could be done rather quickly on the Mesabi range because a number of idle properties already have been opened and are more or less ready for production. Some government financing probably would be required.

Taconite concentrate from the Mesabi range offers the greatest possibility for future ore supplies. An idea of the tremendous reserves of this ore-bearing rock may be gained from Chart 11, showing a generalized cross section of the Mesabi range. The range, which is about 100 miles long and one to three miles wide, is a continuous deposit of the rock, assaying about 30 per cent iron oxide, existing in small crystals.

It lies as a sheet about 500 feet thick on the Giants Range granite, and dips with it toward the southeast at an angle of only about 5 degrees. Toward the



More than 10,000 trips will be made by Great Lakes freighters this year to move an unprecedented 92,000,000 tons of iron ore to lower lake ports, making one of the heaviest traffic systems in the world. Shown above is an Inland Steel Co. vessel unloading at Indiana Harbor. At right, three freighters pass in the St. Clair river

northern edge, the iron formation is exposed in many places, but toward the south, for a distance of one to three miles, it is covered to a gradually increasing depth by loose glacial sand and gravel. Beyond this, slates and hard overlaying rocks cover it.

If this taconite were all the iron-bearing material that occurred on the Mesabi, the range probably would not be the greatest ore producing region in the world today, and probably the steel industry would be concentrated much more along the east coast and in the Birmingham, Ala., district.

However, the action of percolating water over long periods of time at certain locations leached and softened the original iron formation producing areas of partial enrichment. In Chart 11, the high-grade ore produced by more complete leaching is shown nearest the surface. Underneath and surrounding this high-grade ore is an intermediate type of low-grade ore produced by less complete leaching.

These leached and enriched areas are sprinkled here and there along almost the entire 100-mile length of the Mesabi, but occur in greater numbers in the central and western portions. The Class 1, high-grade ore is mined by open pit or underground methods and shipped directly to the blast furnaces. It averages more than 50 per cent iron and less than 9 per cent silica.

The Class 11, or intermediate ore, is variable in analysis and structure, but averages between 35 and 45 per cent iron and between 20 and 40 per cent silica. The best of it is almost as good as the high-grade ore and the poorest is almost as lean as the taconite.

The Class 11 ores must be concentrated before smelting, and the many large concentration plants on the Mesabi now are using the most desirable portions of it. While the total tonnage of this type of material is large, most of it is of a type that cannot be concentrated by known commercial methods. Much research

1941 ORE SHIPMENTS FROM LAKE SUPERIOR DISTRICT

(In Gross Tons)

Range	State	Open Pit Direct Ore	Underground Direct Ore	Concentrate	Total
Mesabi	Minnesota	43,773,000	2,547,000	13,453,000	59,773,000
Vermilion	Minnesota	27,000	1,726,000	94,000	1,847,000
Cuyuna	Minnesota	1,016,000	259,000	1,166,000	2,441,000
Gogebic	Michigan	719,000	4,100,000	0	4,819,000
Marquette	Michigan	785,000	5,470,000	0	6,255,000
Menominee	Michigan	195,000	3,936,000	0	4,131,000
	Wisconsin	0	1,482,000	0	1,482,000
Total L. S. District		46,515,000	19,520,000	14,713,000	80,748,000

LAKE SUPERIOR ORE RESERVES, JAN. 1, 1942

(In Gross Tons)

Range	State	Open Pit Direct Ore	Underground Direct Ore	Concentrate	Total
Mesabi	Minnesota	557,312,000	376,624,000	143,464,000	1,077,400,000
Vermilion	Minnesota	27,000	12,739,000	75,000	12,841,000
Cuyuna	Minnesota	10,048,000	37,689,000	16,677,000	64,414,000
Gogebic	Michigan	630,000	27,682,000	0	28,312,000
Marquette	Michigan	0	48,283,000	0	48,283,000
Menominee	Michigan	630,000	55,031,000	0	55,661,000
	Wisconsin	0	5,000,000	0	5,000,000
Total L. S. District		568,647,000	563,048,000	160,216,000	1,291,911,000

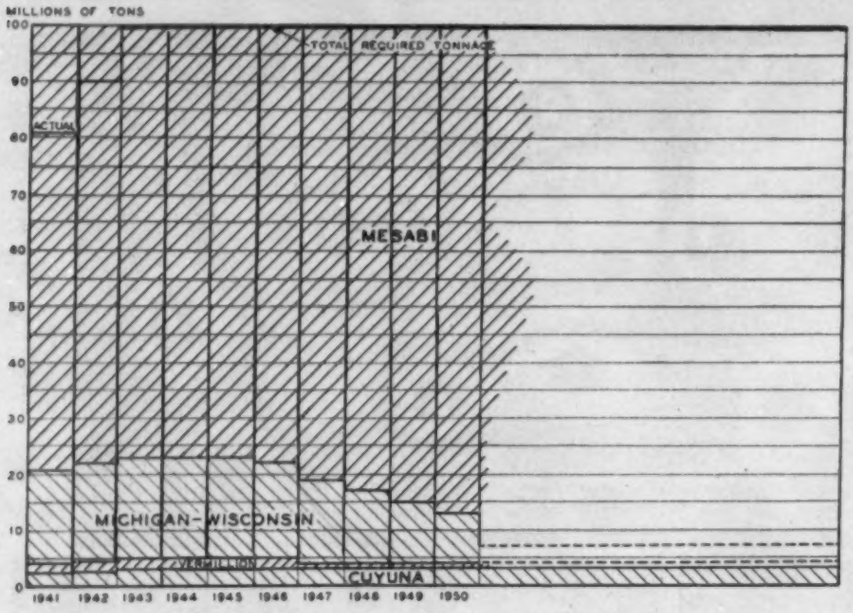


CHART 1—Estimated safe maximum production schedule for the various ore-producing districts is shown above, with the required production from the Mesabi range in order to supply a total of 100,000,000 *tons of Lake Superior ore annually. These figures approach maximum production in all districts except the Mesabi and possibly the Cuyuna*

work has been done on this material and while it all can be concentrated by various laboratory processes, as yet no commercially satisfactory process has been developed to treat any but the wash and jig ores.

The great mass of taconite, labeled Class 111 ore-bearing rock on Chart 11, contains from 25 to 35 per cent iron and from 40 to 60 per cent silica.

Properties Vary

While all of it has the same general structural characteristics, important variations occur. In general, the taconite is divided into two classes: Magnetic and nonmagnetic. In the magnetic taconite, the iron oxide exists as magnetite, a strongly magnetic mineral. In the nonmagnetic taconite, the iron oxide exists largely as hematite, which is nonmagnetic.

From the standpoint of concentration, methods now are in use which, with minor modifications, can be used to concentrate the magnetic taconites; the nonmagnetic ores, like much of the Class 11 ore material, are much more difficult to concentrate.

Thus the magnetic taconites are the most important at present. Concentration processes required for them are similar to those used by Republic Steel Corp. and which are being inaugurated by the M. A. Hanna Co. and Jones & Laughlin Steel Corp. in New York.

The process consists of crushing the rock to a fine size, extracting the iron oxide from it magnetically, and then agglomerating the concentrate. This material can be concentrated by commercial methods to produce sintered ore assaying from 62 to 65 per cent iron, 8 to 10 per cent silica, and from 0.02 to 0.03 per cent phosphorus.

Only in detail and degree does the processing of Mesabi magnetic taconite differ from the standard methods now in actual practice. From 2½ to 3 tons of the rock must be mined by open pit methods to obtain 1 ton of concentrate.

Mr. Davis points out, however, that even if the best methods of mining and processing this ore-bearing rock were already known, and its economic values demonstrated, many years would be required to locate mining areas, open up great mines and erect large plants that could produce only as much as 20,000,000 tons of the concentrate annually. This, he says, is more of a national than a regional or industrial problem.

In addition to the magnetic taconite concentrate, there are immense quantities of nonmagnetic taconite and Class 11 ore material for which there is no known commercial method of concentration. Processes for concentrating this material may be developed eventually.

Mr. Davis says that iron ore prices, if the more expensive conservation program is adopted, must be adequate to cover the higher production costs. Prices for ore delivered at lower lake ports are established each year, but practically all sales are made at prices of from 25 cents to $1 a ton below the established price. The practice of selling below the Lake Erie price, he says, will continue as long as cheap open pit ore is available. Mesabi underground ore and and taconite concentrate cannot compete with open pit ore in the market, and unless the full Lake Erie price, and probably more, is paid for the new ore, it cannot be produced economically. Lake Erie ore was reduced 50 cents in 1940 and the earlier price probably will have to be restored.

Taxes Force Early Mining

Certain pressures, Mr. Davis said, force the operators of open pit mines to produce ore as rapidly as possible even in peacetime, and until these pressures are removed, open pit operators cannot be expected to curtail production. The Minnesota ad valorem tax law is one of the offenders. The best grades of open pit ore pay an ad valorem tax of about 2 1/3 cents a ton annually. If mining of a ton of this material is deferred for 15 years, the accumulated tax with interest amounts to about 45 cents a ton.

The terms of the lease agreements be-

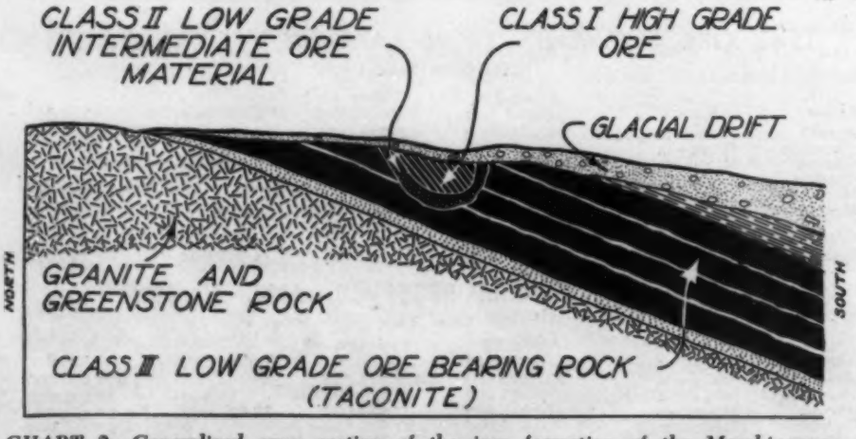

CLASS II LOW GRADE INTERMEDIATE ORE MATERIAL
CLASS I HIGH GRADE ORE
GLACIAL DRIFT
NORTH
SOUTH
GRANITE AND GREENSTONE ROCK
CLASS III LOW GRADE ORE BEARING ROCK (TACONITE)

CHART 2—Generalized cross section of the iron formation of the Mesabi range shows the relatively small size of high-grade ore and the tremendous quantities of taconite, ore-bearing rock, from which concentrates eventually must be obtained

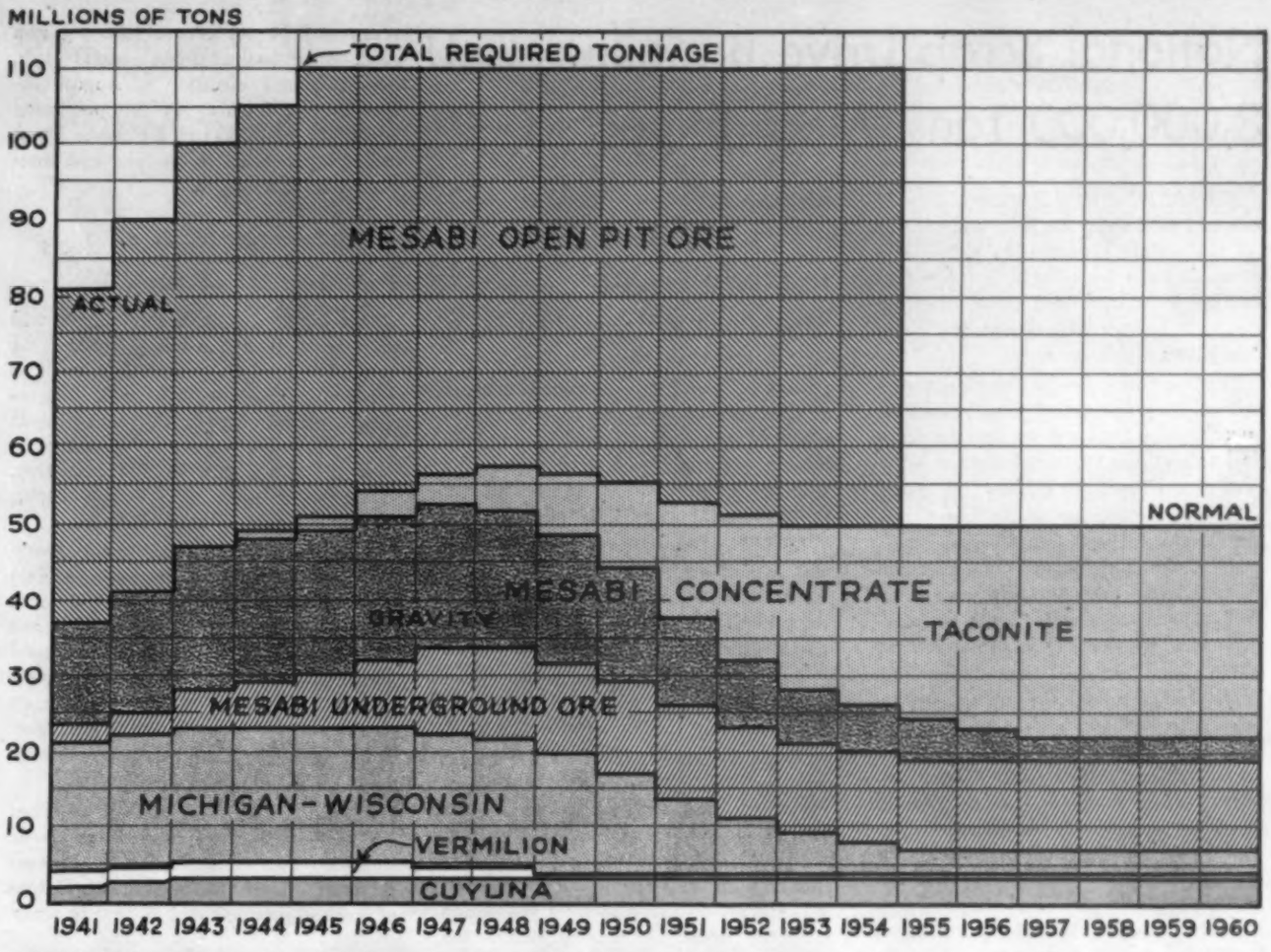


CHART 3—Gradual increase in the production of Mesabi underground ore and taconite concentrate until a normal output of 50,000,000 tons a year can be maintained without use of any open pit ore has been recommended to WPB. Remaining open pit ore, in normal times, thus would be conserved for periods of abnormal demand

tween the operators and land owners also may tend to force the production of open pit ore. In some of these leases, high minimum royalties are charged whether or not the operator produces ore. While these minimums usually are considered as advance royalties, a lease may expire before the operator, in the normal course of the business of supplying his customers, can mine the ore for which he already has paid royalties in advance. The ore is, therefore, mined before the lease expires and thrown onto the market as distress ore, usually at a low price. Many of the leases were made 40 or 50 years ago at low royalty rates, and now are expiring. In making new leases or granting extensions the owners of the property often double or triple the royalty. Result of this is that the operators mine out all the ore they can at the low royalty and force it on the market before the lease expires.

These pressures are forcing the mining of open pit ore by making it uneconomical for the operators to hold the material for any extended period. However, by the time the present war demand period is over, most of the so-called "distress ore" probably will have been mined, and after that the Minnesota ad valorem tax and the minimum royalty provisions will be the chief offenders.

Both these now are being investigated, with the idea of removing the pressures that encourage early exhaustion of open pit ores.

It would, of course, be a simple matter for the government to take over all open pit ore, cancel existing contracts and leases, pay the owners an amount determined by the courts, and then take this ore off the market except in times of unusual demand. This would remove it from the tax rolls, and the whole problem of conserving open pit ore would be quickly solved.

Deliver 500 Hopper Cars In Time for Iron Ore Rush

Minnesota's race with time to get its year's quota of iron ore to the Duluth-Superior docks before zero weather closes the lakes was aided by recent delivery of the last of 500 ore hoppers built by Pullman-Standard Car Mfg. Co., at Michigan City, Ind.

The cars are part of a 1500-car order, divided equally among three companies by the Duluth, Missabe & Iron Range railroad, with Pullman-Standard the first to complete its share.

Half as long as an ordinary freight car, the hoppers carry 70 tons of ore. The railroad placed orders for 2000 cars early in March, but before work could be started, WPB froze freight car construction. On May 11, it released orders for 1500 of the hoppers.

Carnegie-Illinois Steel Corp. has announced a program of cash awards for suggestions advanced by employes, which result in furthering production. It will be conducted by the various war production drive committees established in each plant. Boxes will be provided in mills and offices into which all suggestions will be deposited for appraisal. For each suggestion accepted, the employe will receive an award of $10.

National Scrap Drive Brings in 3,000,000 Tons; More Expected

APPROXIMATELY 3,000,000 tons of iron and steel scrap has been collected in the nationwide campaign to gather idle materials from households, according to incomplete reports, and those directing the drive believe final figures may show nearly twice this amount.

The campaign, led by the newspapers and enlisting the aid of school children, householders, truck owners and the scrap dealers, won the commendations of WPB Chairman Donald M. Nelson.

"It was democracy at its best in action," said Richard W. Slocum, chairman of the Newspapers' United Metal Scrap Drive Committee. He announced they would continue to assist the government's war agencies in the search for scrap.

Mr. Nelson asked the newspapers on Sept. 4 to take the lead in organizing a campaign to draw out old materials necessary for the war effort. The newspapers not only devoted many columns to making the householders acutely scrap conscious, but also supplied leadership in organizing the collections. Almost every community soon had heaps of iron and steel and other materials piled at designated collection points.

Kansas headed the country in the amount of scrap per capita, 97 pounds. National average was 46.9 pounds per capita.

Moving the scrap to the mills is proving to be a problem in many communities. Much of the material collected is light and bulky, requiring considerable time for sorting and baling, and making for uneconomical carloadings. Scrap dealers are handling this task in most places, paying a price for the material that allows a relatively small margin for preparation.

Warehouse Employes Busy

Meanwhile, a new drive to collect dormant scrap from industrial plants has been started. Two thousand employes of steel warehouses, under the leadership of J. J. Hill Jr., Hill-Chase & Co., Philadelphia, are visiting 22,000 industrial plants in all sections of the United States asking owners to scrap jigs, dies, tools and obsolete fixtures which have not been used for three months and for which no use is likely within three months.

The warehousemen have set themselves a goal of 2,000,000 tons of dormant metal.

Associated with Mr. Hill in organizing the drive are J. Frederick Rogers, Buffalo; L. R. Moise, Milwaukee; and C. E. S. Dickerson, Pittsburgh.

High WMI Officials Quit After Agency Is "Scuttled"

The WPB directive curtailing the powers of War Materials Inc., organized as a subsidiary of Metals Reserve Co. to salvage metals that would not flow through ordinary channels under the OPA price ceilings has resulted in the resignations of key WMI officials.

John M. Hopwood, WMI president, and two of his former associates in the Hagan Corp., J. L. Logan and H. A. Bergquist, have resigned and it is expected other high officials also will leave.

Six regional offices which had been established by Mr. Hopwood have been dissolved and the personnel dismissed.

The function of WMI in the future will be merely that of financial agent for the various scrap sections of the War Production Board.

Scuttling of the WMI as the result of friction with WPB's own salvage branches was sharply criticized in steel production quarters where it was expected the agency would make available large quantities of old iron and steel from abandoned buildings, bridges, railroad structures and similar projects where the cost of demolition, preparation and transportation would not permit the movement of the scrap to mill under present price ceilings.

Scrap Stocks Increased 4 Per Cent in August

Domestic stocks of steel and iron scrap at yards of consumers, suppliers and producers at the end of August approximated 5,279,000 gross tons, an increase of 4 per cent over the 5,087,000 tons held July 31, according to the Bureau of the Census. Consumers' stocks increased more than 4 per cent and suppliers' and consumers' holdings gained 1 per cent. Most of the increase in total stocks was contributed by a gain of approximately 5 per cent in stocks of purchased scrap at consumers' plants and a gain of 4 per cent in home scrap.

Scrap consumption in August totaled 4,478,000 tons, only slightly more than the 4,470,000 tons used in July, and at an annual rate of 2 per cent more than in 1941. Open-hearth furnaces in August consumed 58 per cent of the purchased scrap, 72 per cent of the home scrap and 74 per cent of the pig iron used. Steelmaking furnaces, open-hearth, bessemer and electric, in August accounted for 70 per cent of the purchased scrap, 82 per cent of the home scrap and 89 per cent of the pig iron consumed in that month.

Emphasis on Heavy Products Results In Less Scrap

One hundred tons of steel ingots will produce 82 tons of a heavy product but only 65 tons of a light product, such as cold-rolled sheet or strip steel. Therefore, when a mill rolls 100 tons of ingots into cold-rolled sheets it produces 35 tons of scrap suitable for remelting. When the mill rolls 100 tons into shapes, it recovers only 18 tons of scrap.

These figures, according to the American Iron and Steel Institute, explain why the steel industry's recovery of scrap as by-product of manufacturing has not kept pace with the gains made in total ingot production. They also explain why the industry is more dependent on outside sources of scrap.

War conditions have increased the demand for heavy products.

In ordinary years an average of about 70 tons of finished steel is produced from 100 tons of ingots, leaving 30 tons of scrap. Today the average is 75 tons of finished products and 25 tons of scrap.

400 Cities Required To Collect "Prepared" Cans

More than 400 municipalities, over 25,000 population, are required to enlist their regular trash collection machinery in a systematic and continuing collection and segregation of scrap cans.

All private refuse collection in these cities also is subject to the order, contained in an amendment to Order M-72-a.

The amendment requires that trash collection agencies in all municipalities over 25,000 population in 15 northeastern states must collect and keep segregated all prepared cans offered in usual trash collections. Housewives are urged to "prepare" their cans and to keep them separated from other trash, as municipalities are required by this order to collect only those cans which are prepared and kept segregated. The cities must then dispose of the cans only to shredding or detinning plants, or to plants engaged in the precipitation of copper.

The territory affected includes: Connecticut, Delaware, District of Columbia, Illinois, Indiana, Kentucky, Michigan, Maryland, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, West Virginia, St. Louis, Minneapolis, St. Paul and Duluth.

Republic Steel To Undertake Government's $450,000 Experiment

A PROGRAM for the development of sponge iron, "undertaken as an experimental step in increasing the nation's supply of steelmaking metallics," was announced last week by Donald M. Nelson, chairman, WPB. This, he said, involves two parts:

"1. The proposal of the Republic Steel Corp. to build a $450,000 sponge iron plant in Youngstown, with a capacity of 100 tons a day, has been approved.

"2. A committee of individuals with broad, practical and technical experience, to be known as the Steel-Using Industry Advisory Committee, is being established by Iron and Steel Branch Chief H. G. Batcheller. It will consider ways and means to cope with the shortage of scrap, and advise him on the practicability of other individual sponge iron projects which have been submitted to WPB."

Mr. Nelson pointed out that steel experts are divided on the possibilities of producing in important commercial quantities sponge iron suitable for steelmaking.

"Some say that sponge iron is a ready and cheap substitute for scrap. Some take the opposite view. The only way to test thoroughly the possibilities of spong iron is to go ahead with one or two moderate-sized plants, and see what results can be obtained.

"A Real Chance"

"This subject has been thoroughly studied by WPB for the past several months, but wide-scale adoption of the process has not been possible because of technical problems involved. The Republic project, however, now presents an opportunity to give sponge iron a real chance under the most favorable conditions.

"Our position is that testing of the sponge iron process is worthwhile, and that we must not 'miss any bets' in investigating all possibilities of adding to our supplies of steel.

"The Republic proposal differs somewhat from the sponge iron process which has been urged generally in that it contemplates the use of high-grade concentrates from magnetite ores mined in the Adirondacks, in upper New York state.

"It is hoped that this specialized use of the sponge iron process will result in actual operating experience which can be applied, if successful, to other suitable ore where gas is available.

"It is expected that the Republic plant will be in operation in about four to six months. Sponge iron manufactured in the plant will be used by Republic in its own electric steelmaking furnaces. The project has been recommended to the Defense Plant Corp. for financing."

It was reported that Republic had engaged H. A. Brassert as the consulting engineer.

Republic's position has been that it would undertake the project "as an experiment," if the government so desired.

Opposition to the construction of large-scale sponge iron plants was expressed to a House Merchant Marine subcommittee investigating the scrap iron shortage last week by Clyde Williams, director, Battelle Memorial Institute, Columbus, O.

Present processes for making sponge iron, Mr. Williams said, are wasteful of materials, time and fuel. If we had a proved process, we should immediately get into production, he asserted, but "you can't just wish sponge iron; you've got to make it.

"For 100 years, sponge iron has been a 'Will-o-the-Wisp.'"

S. O. Hobart, head of the WPB iron ore unit, appearing before the same committee, said he was anxious to develop sponge iron production, but that no process had been found to be commercially successful. Because of this, he said, he did not feel justified in authorizing the expenditure of any government money for this purpose.

GOVERNOR LIGHTS SECOND DPC-REPUBLIC STACK

REPUBLIC Steel Corp.'s new blast furnace in Youngstown was lighted by Ohio's governor, John W. Bricker (STEEL, Oct. 19, p. 60.) Capacity of the stack is rated at 1100 tons daily. It is the second unit built by Republic under Defense Plant Corp.'s blast furnace expansion program, the first stack having been completed at Gadsden, Ala., May 28. Left to right in the picture are John Pugh, general foreman, blast furnace department; R. L. Leventry, district manager; R. J. Wysor, Republic's president, and Governor Bricker

61,000 Steelworkers In Nation's Armed Forces

More than 61,000 steelworkers entered the armed forces between Oct. 1, 1940, and June 30, 1942, according to a survey by the American Iron and Steel Institute, New York.

Despite this loss of trained men, the tonnage of steel produced by the industry has increased substantially since the autumn of 1940, necessitating not only replacement of men called into military service, but also employment of additional workers.

New Machinery Quota Cut to 20 Per Cent of 1940 Production

CHICAGO

RESTRICTION of farm equipment manufacture to 20 per cent of 1940 for the year beginning Nov. 1 and rationing of this output come as a severe blow to manufacturers, distributors and dealers. Nevertheless, these groups are preparing to co-operate cheerfully and wholeheartedly, since winning of the war is America's No. 1 problem. The implications of the situation came up for much discussion at the closing session of the National Wholesale Hardware Association's meeting here last week.

The program of rationing of new farm machinery and equipment was explained by F. B. Northrup, Department of Agriculture, Washington. At present, a temporary rationing plan is in effect, but it will be replaced Nov. 1 with a permanent plan. In the meantime, manufacturers, distributors and dealers are being requested to report idle or surplus stocks on hand.

In view of the tremendous demand being placed on the food production industry, production quotas for the coming year are disappointingly low, Mr. Northrup stated, but these were established by WPB which had to decide whether available steel is needed more urgently for direct or indirect war use.

Quota Reductions Drastic

In its effort to soften the blow on the farmer, WPB will permit the manufacture of repair and maintenance parts at 130 per cent of 1940. For 1942, the quota was 150 per cent. The quota on tractors will be about 15 per cent. Fencing has been set at around 50 per cent, against 33 per cent this year. The rationing program makes no provision for controlling the sale of used equipment, but Mr. Northrup said this probably would be undertaken if it is discovered prices are getting out of line.

All manufacture of farm equipment will be rationed on an area basis. A farmer will make application to his county board and if his request is denied, he can appeal to his state board, and if again over-ruled, can appeal to the secretary of agriculture for relief.

It is reported that the quota for horseshoes and nails has been established at 75 per cent of 1940, and several members of the association protested that with increasing use of horses and mules in farm production, this figure will fall far short of meeting demand. Mr. Northrup pointed out that in all probability some of the quotas may have to be revised if it is found they are working a hardship.

Officers of the National Wholesale Hardware Association were elected as follows: President, F. F. Thomson, Thompson-Diggs Co., Sacramento, Calif.; vice presidents, Edward F. Pritzlaff, John Pritzlaff Hardware Co., Milwaukee, Henry J. Allison, Glasgow-Allison Co., Charlotte, N. C., Eugene Foley, Bayonne Steel Products Co., Newark, N. J.; executive committee, 1942-45, W. A. Parker, Beck & Gregg Hardware Co., Atlanta, Ga.; John H. Mize, Blish, Mize & Silliman Hardware Co., Atchison, Kans., H. W. Conde, W. W. Conde Hardware Co., Watertown, N. Y.; to fill unexpired term of Mr. Pritzlaff, 1942-44, Charles L. Wheeler, Salt Lake Hardware Co., Salt Lake City, Utah.

Frank Silloway

As reported on page 50, the American Hardware Manufacturers Association and the National Association of Sheet Metal Distributors also held their convention in Chicago, jointly with the National Wholesale Hardware Association.

Officers elected by the American association are: President, S. T. Olin, Western Cartridge Co., East Alton, Ill.; vice presidents, J. S. Tomajan, Washburn Co., Worcester, Mass., R. S. Rauch, North Bros. Mfg. Co., Philadelphia, H. P. Ladds, National Screw & Mfg. Co., Cleveland; executive committee, 1942-45, H. B. Curtis, Bridgeport Hardware Mfg. Corp., Bridgeport, Conn., Robert H. Gates, Turner, Day & Woolworth Handle Co., Louisville, Ky., F. A. Bond, McKay Co., Pittsburgh; secretary-treasurer, Charles F. Rockwell, 342 Madison avenue, New York.

Officers elected by the National Association of Sheet Metal Distributors: President, Eugene Foley, Bayonne Steel Products Co., Newark, N. J.; vice presidents, Bruce Haines, E. E. Souther Iron Co., St. Louis, and H. E. Usinger, Berger Bros Co., Philadelphia; executive committee, 1942-45, Arthur M. Vorys, Vorys Bros. Co. Inc., Columbus, Ohio, and H. B. Thompson, Conklin Tin Plate & Metal Co., Atlanta, Ga.; to fill unexpired terms of Mr. Haines & Mr. Usinger; 1942-44, Henry A. Hoeynck, Shapleigh Hardware Co., St. Louis, and William A. Vernier, Superior Safety Furnace Pipe Co., Detroit; advisory board, Retiring President, A. J. Becker, Ohio Valley Hardware & Roofing Co., Evansville, Ind.

Silloway Named President of Farm Equipment Institute

Frank Silloway, vice president, Deere & Co., Moline, Ill., was elected president, Farm Equipment Institute, at the organization's forty-ninth annual convention in Edgewater Beach hotel, Oct. 15. He succeeds W. H. Roberts Jr., secretary and sales manager, S. L. Allen & Co., Philadelphia.

C. B. Schmidt, general manager, De Laval Separator Co., Chicago, was named chairman of the executive committee. New members of this committee are J. L. McCaffrey, second vice president, International Harvester Co., Chicago, and E. F. Schiele, general sales manager, Massey-Harris Co., Racine, Wis. Re-elected were Cal Sivright, president, Oliver Farm Equipment Co., Chicago, and Theodore Johnson, secretary, J. I. Case Co., Racine, Wis. Re-elected group representatives on the committee are: George S. Hooper, George S. Hooper Co., Memphis; and H. C. Angster, Chicago.

Two newly-elected vice presidents are: W. K. Hyslop, vice president and general manager, Massey-Harris Co., Racine, Wis.; and A. L. Mercer, assistant to president, Cleveland Tractor Co., Cleveland.

Vice presidents re-elected include first vice president F. H. Clausen, president, Van Brunt Mfg. Co., Horicon, Wis.; L. R. Clausen, president, J. I. Case Co., Racine, Wis.; C. Gordon Cockshutt, president, Cockshutt Plow Co. Ltd., Brantford, Ont.; W. J. Fisher, vice president, A. B. Farquhar Co. Ltd., York, Pa.; J. W. Gehl, secretary and general manager, Gehl Bros. Mfg. Co., West Bend, Wis.; P. E. Herschel Jr., vice president, R. Herschel Mfg. Co., Peoria, Ill.; C. A. Hines, president, Farm Tools Inc., Mansfield, O.; H. C. Lisle, manager, John Bean Mfg. Co. Division, Food Machinery Corp., Lansing, Mich.; Fowler McCormick, president, International Harvester Co., Chicago; and H. B. Megran, secretary, Starline Inc., Harvard, Ill.

New Tin Plate Restrictions Close West Coast Mill

SAN FRANCISCO

Columbia Steel Co., United States Steel Corp. subsidiary, last week, issued the following statement:

"To conserve critical materials, the government has directed another 25 per cent decrease in the rate of production of tin plate to be effective over the fourth quarter of 1942. Because of previous similar government directives, Columbia's tin mill operations have been materially reduced.

"The latest would put Columbia's tin mill operations at only 37½ per cent of capacity, which due to increasing difficulties in maintaining satisfactory work schedules would be an impractical operation. A decision has therefore been made to discontinue, temporarily at least, all tin mill operations at the Pittsburg, Calif., plant, diverting the steel to other war uses.

"Because of already reduced tin mill to absorb all of these men in other operations of the plant."
operations, the number of employes affected has been reduced to approximately 200. It is the hope of the management

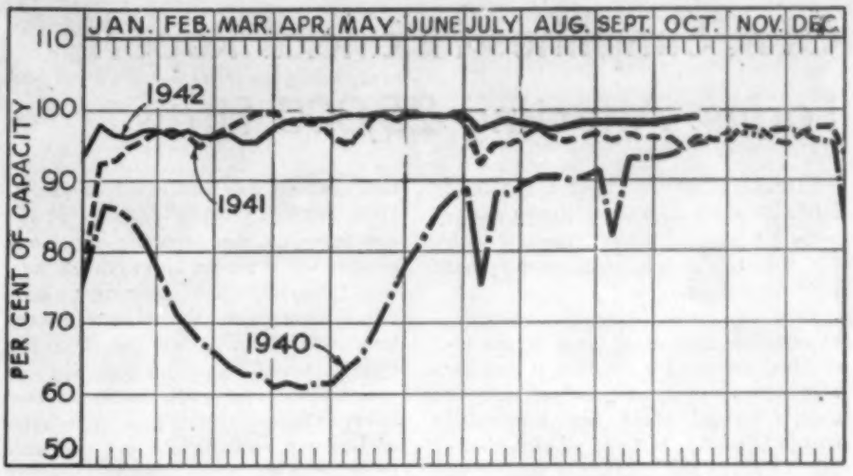
Steel & Wire Plants Set 66 More Output Records

Plants of American Steel & Wire Co. added 66 new high production records in September, making 635 new tops since Pearl Harbor. Company reports more than half were achieved at Worcester, Mass., South Works making 20 and North Works 15. Cleveland plants accounted for 9, Consolidated and American Works three each, Newburgh Works two and Cuyahoga Works one. Donora, Pa., plant broke eight former records; New Haven, Conn., operations set five new marks, Trenton, N. J., plant four, Waukegan, Ill., three and Rankin, Pa., and Joliet, Ill., one each.

American Steel Foundries' Plant Ready To Operate

American Steel Foundries will open its new steel foundry in East Chicago, Ind., Oct. 29, it is announced by Thomas Drever, president. The foundry, claimed to be the largest of its kind in the world, will be used for war material.

Financed by the Defense Plant Corp., the plant represents an investment of more than $25,000,000, and is situated on a 94-acre tract. Construction is now 90 per cent complete. It is expected to be in full operation in December.



STEEL . . . . . STEADY

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99 per cent, three districts making small gains, one declined and eight were unchanged. A year ago the rate was 95½ per cent; two years ago it was 95½ per cent, both computed on the basis of capacity as of those dates.

Pittsburgh — Dropped 1½ points to 97½ per cent, canceling the advance of the previous week, because of furnace repairs.

Wheeling — Held at 79½ per cent.

Chicago — Maintained 103½ per cent for the second week, scrap supply being no longer a factor and furnace repair the only deterrent.

Youngstown, O. — With three bessemers and 75 open hearths active the rate held at 95 per cent for the sixth week. The same rate is scheduled for this week. Carnegie-Illinois Steel Corp. blew in a blast furnace Friday at Ohio Works, relieving the scrap situation somewhat.

Detroit — Advanced 5 points to 92 per cent, all open hearths except two being active.

St. Louis — For the second week steel output was 97 per cent.

Cleveland — Gained 2½ points to 98½ per cent as two interests increased activity.

Birmingham, Ala. — Unchanged at 95 per cent with 23 open hearths in production, 15 for the Tennessee Coal, Iron & Railroad Co. and eight for Republic Steel Corp.

Buffalo — Only three open hearths are out for repairs and production held at 93 per cent, reaching 98 per cent for a short time while Lackawanna plant of Bethlehem Steel Co. had all its furnaces on.

Cincinnati—Addition of repaired open hearths gave a rise of 5 points to 97 per cent.

Central eastern seaboard—With sufficient scrap supply steelmaking continued at 96 per cent for the sixth week.

New England—One open hearth continues down for repairs and the rate is steady at 95 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 24	Change	Same week 1941	Same week 1940
Pittsburgh	97.5	—1.5	99	92
Chicago	103.5	None	102	98
Eastern Pa.	96	None	93	93
Youngstown	95	None	98	91
Wheeling	79.5	None	94	93.5
Cleveland	98.5	+2.5	97	90
Buffalo	93	None	83.5	90.5
Birmingham	95	None	95	97
New England	95	None	90	90
Cincinnati	97	+5	91.5	94
St. Louis	97	None	83	82.5
Detroit	92	+5	32	97
Average	99	None	*95.5	*95.5

*Computed on basis of steelmaking capacity as of those dates.

Forecasts One-Third Less Steel Construction in 1943

A decline of one-third in the volume of construction in 1943 was forecast by Stacy May, director of the statistics division, War Production Board, in a telegram to Clyde G. Conley, president, American Institute of Steel Construction.

Because of this reduction of volume and use of methods which economize on steel, Mr. May said, "it is expected that the volume of fabricated structural steel which will be required for building and engineering construction, exclusive of shipbuilding in 1943, will amount to not over a million and a quarter tons."

OPA Simplifies Financial Report Forms, Affecting 25,000 Firms

SIMPLIFICATION in the reporting forms by which 25,000 companies voluntarily file financial reports quarterly with the Office of Price Administration has been announced.

Most important change eliminates the requirement that a company report individual salaries for its officers and for employes receiving $20,000 a year or over. Instead there are substituted simple tabulation of these salaries, showing the range and number of persons in this class but omitting reports on salaries of particular individuals.

"This change," OPA explained, "decreases the amount of confidential information which companies are asked to supply without depriving OPA of sufficient detail with regard to executive salaries. So important is this change that insert sheets are being printed and will be available for the use of companies reporting on a fiscal year basis during the balance of 1942."

Another change in the financial report forms, which will take effect on Jan. 1, 1943, will be a provision in the profit and loss schedule for reporting separately charges which are set up to provide wartime reserves. The instruction book which accompanies the forms will carry instructions for adapting the corporate-type statements to use for reporting sole proprietorships and partnerships. In some lines of business, reports from these forms of business organizations are necessary in order to get a complete picture of a given industry. In addition, the instruction book will be simplified and clarified in a number of respects in order to make the filing of financial reports easier.

The financial reporting forms give OPA continuing and basic information on price control problems in industries subject to OPA regulation. At present reports are being obtained from virtually all companies with assets of $250,000 or more engaged in manufacturing, mining, construction, and selected companies in wholesale trade and related fields.

Steel Producers' Third Quarter Earnings Reports Show Decrease

Nine-month and third-quarter profits of the first steel producers to report generally show a decrease from corresponding periods of 1941, due to heavier taxes and higher costs.

Republic Steel Corp.

Nine months' net income of Republic Steel Corp. totaled $10,658,221, equal to $1.61 a common share, against $17,997,095, or $2.90 a share in like period a year ago.

Tax provisions amounted to $54,200,000 in latest period, compared with $29,975,000 a year ago.

Third quarter net totaled $2,581,100, equal to 37 cents a common share. This compares with $3,355,158, or 50 cents a share in the preceding period and net of $4,378,379, equal to 68 cents on common, in quarter ended Sept. 30, 1941.

Crucible Steel Co.

Crucible Steel Co. of America reports net profit for nine months ended Sept. 30 of $5,471,379, equal to $9.53 per common share. This compares with net income of $4,275,064, or $6.79 on common, in like 1941 period.

Federal income and profits taxes amounted to $27,224,015, against $10,486,300 in like period a year ago.

Third quarter profit totaled $2,135,917, against adjusted net income of $1,932,541 in the June period and profit of $1,677,640 in quarter ended Sept. 30, 1941.

Woodward Iron Co.

Nine months' net profit of Woodward Iron Co. totaled $618,184, equal to $1.84 a share on capital stock. In like 1941 period net amounted to $1,032,623, or $3.09 a share. Tax provisions during the latest period totaled $1,485,550, against $662,101 in nine months ended Sept. 30, 1941.

Keystone Steel & Wire Co.

Keystone Steel & Wire Co. reports net profit of $191,576, equal to 25 cents a share on 757,632 shares capital stock, for the quarter ended Sept. 30. This compares with profit of $352,414, or 47 cents a share, in like period a year ago.

Continental Steel Corp.

Nine months' net profit of Continental Steel Corp. amounted to $621,999, equal to $2.63 per common share, against profit of $932,149, or $4.16 on common, in like 1941 period.

Federal taxes for the nine months amounted to $811,000, against $834,875 a year ago.

Profit for quarter ended Sept. 30 totaled $218,251, equal to 93 cents on common, against $234,410, or $1.02 a share in the June quarter, and $294,592, equal to $1.31 a share, in September quarter last year.

Acme Steel Co.

For the quarter ended Sept. 30 Acme Steel Co. reports net profit of $354,460 after provision of $868,979 for income and excess-profits taxes. Its net profit for the same period of 1941 was $761,154, while for the quarter ended June 30, 1942, Acme's net was $880,285.

The company's net profit for the 12 months ending with September was $2,000,489, while for the 12-month period through September of 1941 its net was $2,865,850. Profit for the 12 months just ended is equal to $6.09 a share on the firm's 328,108 shares of capital stock.

Lukens Steel Co.

Lukens Steel Co., Coatesville, Pa., reports net profit for the 48 weeks ended Sept. 12 as $1,476,593, compared with $1,918,648 in the corresponding period of 1941. Tax provisions amounted to $4,675,880 in the latest period, against $1,395,084 last year.

Sharon Steel Corp.

Sharon Steel Corp's September quarter net profit totaled $311,387. This compares with $386,900 earned in the preceding three months, while in the corresponding period last year the company reported net income of $412,899.

In the first nine months net income aggregated $948,589, or $1.85 a share, compared with $1,226,140, equal to $2.55 a share in like 1941 period.

Tax provisions amounted to $2,442,000, against $1,940,000 in first nine months of 1941.

Interlake Iron Corp.

September quarter net profit of Interlake Iron Corp. totaled $311,521, equal to 15 cents per share on capital stock. This compares with net of $247,840, or 12 cents a share, in the June quarter, while in like 1941 period the company earned $524,698, equal to 26 cents a share.

Based on quarterly reports net income for the nine months period suggested $1,004,123, or about 49 cents per share. In like 1941 period net profit amounted to $1,824,022, equal to 91 cents a share.

In the September quarter Interlake set aside $473,000 for federal income and excess profits taxes, compared with $472,000 in June period and $648,100 in September, 1941, quarter.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, July 6, 1942

M ORDERS

M-72-a (Amendment): **Lead and Tin Scrap,** effective Oct. 20. Requires that trash collection agencies in all municipalities over 25,000 population in 15 northeastern states must collect and keep segregated all prepared tin cans offered. Includes terneplate cans with tin scrap which may not be sold to steel producers. Unless otherwise specifically authorized by WPB, tinned scrap may be sold only to brokers and dealers for resale in the form received, to detinners, shredding plants, their agents, regular trash collection agencies, and copper precipitation plants.

P ORDERS

P-57 (Amendment): **South American Copper Mines,** effective Oct. 19. Assigns rating of AA-2X to 35 per cent of operating material ordered in a six month period; A-1-a to balance.

P-73 (Amendment): **Smelters, Refiners,** effective Oct. 19. Assigns rating of AA-2X for delivery of materials for maintenance and repairs; A-1-a for operating supplies. Only mines holding serial numbers are entitled to use the preference ratings.

P-120 (Amendment): **Aluminum, Magnesium Plants,** effective as of Oct. 6. Assigns rating of AA-2X to deliveries of metals in any form on materials list No. 1 of PD-25A and to all fabricated metal parts and lumber; AA-5 assigned to deliveries of all other material.

L ORDERS

L-61 (Amendment): **Tire Retreading, Recapping Equipment,** effective Oct. 10. Restricts production, sale and delivery of equipment to orders rated A-9 or higher on a preference rating certificate PD-1A or PD-1X, or forms of the PD-408 series.

L-75 (Amendment): **Coal Stokers,** effective Oct. 10. Restricts sales of stokers capable of feeding more than 60 pounds of coal per hour to those authorized on PD-668. Output of smaller stokers was banned after May 31 but replacement parts may be made.

L-197 (Amendment): **Steel Shipping Drums,** effective Nov. 14. Prohibits use of new or second-hand steel shipping drums for packing about 200 food, chemical and petroleum products.

L-203: Combat Measuring Instruments, effective Oct. 13. Prohibits sales of specified types of instruments, unless authorized. Purchasers must apply on PD-674. Manufacturers must file PD-675 and PD-676 by Oct. 25 and 15th of each month thereafter.

PRIORITIES REGULATIONS

No. 15: Issued Oct. 10. Frees all exports, including Lend-Lease shipments and unrated orders, as well as those assigned ratings by BEW, from end-use and inventory restrictions in foreign countries. Manufacture in this country remains subject to WPB regulations.

No. 16: Issued Oct. 15. Requires manufacturers to file appeals on form PD-500 in WPB's field offices for relief from restrictions imposed by 31 specified conservation and limitations orders.

No. 134 (Amendment): **Road Machinery,** effective Oct. 22. Provides coverage for operating or maintenance services as well as the rental of construction and road maintenance equipment. Revises rental rates.

No. 204 (Order): **Idle or Frozen Materials,** effective Oct. 15. Establishes prices at which Metals Reserve Co. may buy idle or frozen stocks of tin oxide and tin anodes. For dry weight of tin content, properly packed in wood containers, f.o.b. point of shipment, the prices are in cents per pound when sold by consumers: virgin tin oxide, 66.00c; reclaimed tin oxide, 63.00c; unused tin anodes, 60.00c; partially used tin anodes, 56.00c; used or partially used tin anodes sold by a consumer who cast the anodes, 54.00c. Price of virgin or reclaimed tin oxide sold by producers is 55.75c.

No. 241: Malleable Iron Castings, effective Oct. 21. Establishes maximum prices at (1) the level prevailing between Oct. 1 and Oct. 15, 1941, inclusive; or (2) if the castings to be priced were not sold during that period, maximum prices are to be computed according to the pricing method, costs and profit margins in effect for the seller on Oct. 15, 1941 (with certain exceptions for overhead rates, costs of materials, and outside machining.) Each seller must file by Nov. 20 with his regional OPA office three copies of his published price lists in effect between Oct. 1 and Oct. 15, 1941. By Dec. 20 he must file information as to wage rates, profit margins, and pricing methods in effect for him on Oct. 15, 1941.

No. 244: Gray Iron Castings, effective Oct. 26. Establishes maximum prices for each seller at (1) the highest price at which he sold the same or substantially the same castings between Aug. 1, 1941, and Feb. 1, 1942; or (2) if he did not sell or offer for sale during the period the casting to be priced, he may compute the maximum by applying the pricing formula and cost factors which he used on Feb. 1.

Additional Materials for Fourth Quarter May Be Allotted

Manufacturers working under the Production Requirements Plan who have urgent need of materials over and above the amounts authorized for fourth-quarter use may apply for additional quantities on Form PD-25F, but are warned that only applications covering material necessary to the war effort or for essential civilian uses can be considered.

Instructions for filling out the application forms for supplemental authorizations direct that a separate PD-25F be filed for each class of product covered by the authorization on PD-25A. Applicants must submit a covering letter explaining in detail the purpose for which additional material is being requested, indicating whether it is for use or receipt, as indicated on the PD-25A authorization, and whether an appeal is being made for permission to divert quantities already authorized for use in one product to the production of another.

Priority Aid for Non-War Construction Revoked by WPB

WPB Chairman Donald M. Nelson has notified heads of eight governmental agencies that he has given instructions to revoke priority assistance to a large part of nonmilitary construction for the federal government.

Exceptions are made only insofar as such construction is directly essential to the war effort. At the same time a review of all military projects, of the Army, Navy and Maritime Commission, with the same end in view, is being made.

"As things now stand," Mr. Nelson said, "facilities and construction, including many projects not related to the war effort, programmed for 1943, with the carry-over of uncompleted 1942 projects, will absorb between one-fifth and one-fourth of the total war effort.

"As a result," he continued, "the aggregate demand of such projects for materials, labor, transportation, manpower, and technical and engineering services is so great as not only to jeopardize the various military and essential civilian production programs in general, but to force the most essential war projects dangerously behind schedule."

Construction Machinery Survey Under Way

CHICAGO

All construction machinery in the country, both privately and publicly owned, is being surveyed and listed by WPB for use in the war effort. This was revealed by H. O. Penn, supervisor, track-laying tractor and used construction machinery section, WPB, Washington, at the fall meeting of the Associated General Contractors of America Inc., in Drake hotel here last week.

Mr. Penn stated that millions of dollars' worth of idle equipment owned by WPC, CCC, National Forest Service, and other federal agencies, will be subject to requisition on either a sale or rental basis in military work, Pan American highway construction, lend-lease activities and in other war activities here and abroad. "Any arm of the government may tap this vast pool of machinery for immediate use in any way that will help the war effort," he said.

It is estimated about 500,000 pieces of used equipment are available, all of which are in either good or easily repaired condition. This equipment is comprised mainly of cranes, shovels, tractors, concrete mixers, and the like.

Military forces need machinery so urgently, and restriction of critical materials is so severe, it is necessary to tap this inventory of available used equipment, Mr. Penn declared.

He revealed also that demand for track-laying tractors is outrunning production since "this equipment, in war circles, takes on equal importance with airplanes, with the result that it is being placed into active combat service as quickly as it is released from the plants."

WINDOWS of WASHINGTON

Rationing no easy problem for OPA officials. Human angles must be considered. Sugar and fuel oil allocations sure to be unpopular. Necessity dictates spread of system

NOW that rationing of goods has gotten off to a good start, and with much additional rationing still to come, it becomes a certainty that rationing is to be a subject for more conversation in the near future.

Hardly anyone except the insiders has a real understanding of rationing. Just how much thought is given to rationing setups? To what extent are they based on the whims of one or more individuals in government? These are some of the questions widely asked even though there is a general understanding that rationing is necessary in wartime.

It is unfortunate that many government officials and many Congressmen are given to making statements that are not entirely based on fact. A classic example of such blowing off of steam was in connection with rubber. It took the report of the Baruch Committee to reveal the basic facts about rubber and clear up the controversy as to whether or not there was enough rubber to go round.

Informed observers are of the opinion that despite all of the contradictory statements that have come from various Washington offices on this or that angle of rationing, the rationing that already has been brought about has been set up intelligently and justly. Some mistakes have been made and no doubt more of them will come to light. For example, the sugar rationing system did not work too well this summer and early fall because of misunderstandings on the part of certain local rationing boards. Mistakes of the future are expected to be fewer in number since many lessons about rationing have been learned through experience.

Difficult To Organize

Rationing systems are organized in the hard way, as a result of months of intensive study of all factors involved. In formulating rationing programs you start first by setting up the best possible estimate as to how much will be available of the product to be rationed. You compare this with the normal consumption. Then you determine how to spread out the deficiency without disturbing the war effort and without causing any more individual sacrifices than are strictly necessary.

Your ultimate rationing arrangement has certain objectives in mind. You have to control who gets what. You want everybody affected to get his fair share of what is available and thus help build morale. You fix a price ceiling on goods in order to fight inflation and then through rationing you relieve pressure on price ceilings.

In formulating your rationing system you must remember at all times that you are dealing with human beings, their appetites and their needs. You realize that it is going to be pretty difficult to make sugar or gasoline rationing popular. You realize that you are treading on uncultivated soil and that no matter how well you do your job you are going to encounter grumbling, or, at the very least, good-humored ridicule and witticisms. Hence you sit up nights and go to work Sundays, checking and rechecking all your information and all details of your plan, so that you can defend it on all counts and make allowances for any contingencies that may arise as far as you can see ahead. In other words, you realize that you are handling a hot poker.

How Fuel Oil Plan Grew

How the human element is considered may be illustrated by describing how some of the angles of the fuel oil rationing system were worked out. This system was evolved by Joel Dean and a substantial staff in the Office of Price Administration after months of study.

At the outset OPA obtained from the War Production Board and the Office of Petroleum Co-ordinator estimates as to the amount of fuel oil that would be available this coming winter. From a figure it regarded as conservative it first deducted the amount of oil consumed in war and essential civilian industries; these uses are not to be rationed although some reduction in use here is expected to result from conversions to other fuels.

What was left over, therefore, was to be shared by the remaining users—largely the owners of residences with heating units dependent on fuel oil. That immediately brought up the human factor. OPA had to consider the health and comfort of these people and the maintenance of their morale. To develop a positive program to protect public health the fuel rationing division made detailed case studies of more than 600 residences of all types and of varying thermal efficiency. As a result of this study every aspect of the rationing plan including the heat loss formula was pretested in detail.

On the basis of the estimated total supply, it came to the conclusion that residences with "standard" thermal efficiency, as defined by this formula, would have to get along with only two-thirds of their normal gallonage. On the other hand, to establish an incentive to home owners to insulate their homes and equip them with storm sash, a deeper-cut was applied to houses capable of greatest improvement in thermal efficiency and owners of efficient houses were allowed 85 per cent of their normal supply. Residences high in heat losses were allowed less than 66 2/3 per cent of the normal supply, the precise cut depending on their thermal efficiency.

Under the rationing plan the individual's ration is based upon the normal temperature in his particular community. The country is split up into "weather" zones which have winter cold of varying intensities. Each zone has coupons of a different color so as to prevent importation from a zone having coupons higher in gallonage value. The heating season is split into five thermal periods equal in fuel requirements. This is done to make possible adjustment of the ration for unusual weather.

Let us say that a householder decides in favor of normal comfort during the period covered by the first coupon. He begins to run short of oil and asks the local rationing board for relief. The rationing board permits the householder to draw some oil against the second coupon and warns that the thermostat be set at a lower level or that the house be better insulated and so on. Under this elastic system most householders should soon begin to realize the need for full co-operation.

The value of the coupons is to be adjusted in accordance with the weather. The first coupon will have a value of ten gallons. Values will be determined to a considerable extent by the actual as compared with the normal number of "degree" days in each period—days when the thermometer outside drops below 65 degrees Fahr.

System Must Be Flexible

The fuel oil rationing system is sufficiently flexible to permit more liberal treatment where that is necessary. Provided one has his house in satisfactory thermal condition, and provided he is unable to convert to other fuels, also provided he can obtain certification of a licensed physician, he can get extra oil in cases of sickness, old age or when babies crawl around on the floor.

Fuel oil panels in local boards will make decisions as to the thermal efficiency of residences and whether they can be converted. In making their recommendations they are expected to consider the householder's ability to pay for conversion as well as the effect

of such conversion on the war program.

Incidentally, it is felt that conversion should be made when they cost in the neighborhood of $1 per barrel of fuel oil consumed. Some householders have converted at costs as high as the equivalent of $2 per barrel of oil.

Still another human angle was considered in determining just how to implement the oil rationing system. At one time the possibility of rationing through dealers was explored. This proved undesirable for a number of reasons. Dealer records are not exact. Many communities have lost population as a result of the war while others have gained sharply. Then, dealers in some cases might get fuel oil for dead customers and turn it over to live ones and thus beat the game. Under any scheme of dealer rationing the dealers would be under pressure from customers and evasions therefore might develop on a substantial scale. Hence the decision to rely upon local boards who know their neighbors and know who the "chiselers" are likely to be.

There are some other features of the fuel rationing system that are quite realistic. Where oil has to be hauled a distance for delivery, householders may cash in more than one coupon at one time, with coupon values determined by the local boards. This is to save on trucks and tires.

As Mr. Dean puts it: "The whole system is aimed at equalizing and minimizing discomfort by stimulating people to do something to help themselves. If all do everything they can to improve the thermal efficiencies of their homes, cut fuel requirements by closing off a room or two, or convert to other fuels in whole or in part, there will be very little suffering from the fuel oil shortage."

Post-War Planning Not Unpatriotic

A SALESMAN recently visited one of STEEL's editorial offices to ask for some guidance. Because his company does not have to sell its product under wartime conditions, he was asked to conduct some studies with the objective of setting up a plan for postwar activities. The company does not wish to depend only on its regular line of products to stay in business after the war. It wishes to have a number of strings to its bow so as to be able to jump in accordance with the way the wind blows.

In making certain contracts to get needed facts and opinions, said this salesman, he had been accused more than once of being unpatriotic. He should get to work at something that will help win the war, he was told in these instances.

It may be stated that in high places at Washington postwar planning, now, is considered to be patriotic. A lot of planning of such nature is in process here and has been under way for many months. Excepting for a few broad references in speeches by Vice President Wallace and certain others high in government, the work is not being publicized because that might divert some of the emphasis to the war effort. It may be stated, however, that some of the best brains to be found in government, in the fields of agriculture and industry and in the ranks of labor union leaders are actively engaged in such planning.

The general attitude is that the country cannot be allowed to emerge from the war without a definite, workable plan for converting back to a peacetime economy in a safe, orderly manner. Widespread employment must be provided. Domestic and world needs must be satisfied. There must be an adequate world exchange arrangement after the war. All this requires overall study and planning.

All our large corporations and a great many of moderate size have been giving and continue to give much more careful attention to the postwar period than the average man realizes. Most of them feel quite confident that they will be able to adapt themselves to contingencies of the future.

As one corporation head puts it: "We will because we must."

There is also an immediate, present value to this sort of planning. "Our key men have known for many months that we are planning along these lines," continues this executive. "Knowing that we firmly intend to keep them on the payroll in the future, they have resisted offers of employment elsewhere. Thus we have kept our organization together and are in a good position to face the future."

The transitional job in the postwar period will be of the same mammoth proportions as the job of converting for war has been. Hence it goes without saying that in all main details it will be supervised by the government. However, there now appears to be unanimous agreement among those in Washington interested in the postwar problem that business after the war will continue to be done largely through private enterprise.

SUPREME COURT MEMBERS VISIT THE PRESIDENT

RESIGNATION of Justice James F. Byrnes to become Director of Economic Stabilization leaves an empty chair in the Supreme Court and a vacancy in the file of justices—photographed recently in their traditional annual visit to the President. Left to right in the group are Solicitor General Fahy; Attorney General Biddle; Justices Jackson, Murphy, Douglas, Frankfurter, Reed, Black, Roberts; and Chief Justice Stone. NEA photo

Murray Demands Defeat of All Roosevelt Opponents

Philip Murray, president, Congress of Industrial Organizations, in a signed editorial in a recent issue of *CIO NEWS*, called for support of President Roosevelt and all his friends and the defeat

QUICK, EASY TOOL CHANGES

Highly Versatile Knee-type HydrOILic Press

The time you save in switching tools, fixtures, bolsters or supports from one job requirement to another is just *one* advantage this DLKC2 HydrOILic Press offers. Another is the smooth, flexible accuracy of its *oil hydraulic* operation—you can quickly adjust its power and control to meet varying requirements, and be sure of hairline precision on each job. And the compact, safety-cornered frame fully encloses and protects the operating mechanism, clearing the way for *safe*, high-speed operation. Equally suitable for production-line pressing jobs, the knee-type press is built in 5- and 15-ton capacities, with manual or electric controls. It has a maximum stroke of 30 inches; a daylight opening of 46 inches. Write today for details, or call your Denison representative.

Priorities still have first call on HydrOILic Press output. But since conditions may change rapidly we suggest you submit your requirements to us without delay. We will tell you promptly the delivery we can make in your particular case.

OPERATION

When the ram is at the limit of the up-stroke, the shipper rod holds the control valve in neutral position. Down movement of the control lever causes the shipper rod to rise, throwing the control valve into "starting" position. The ram then lowers until it reaches the limit of the down stroke (not standard on electrically-controlled press) which is controlled by a "stop" on the shipper rod. This forces the shipper rod down, throwing the control valve into neutral position. Releasing the control causes the ram to move up. When the ram reaches the "up" limit, the cycle is completed. The ram is then hydraulically held in position and the pump freely circulates its volume, consuming minimum HP. If the work is contacted before the lower stroke limit is reached, the press will continue to exert tonnage against the work until the controls are released. Tonnage can be adjusted from the maximum rating to approximately 10% of maximum.

DIMENSIONS

	DLKC 2-5				DLKC 2-15			
A	12	18	24	30	12	18	24	30
B	6	6	6	6	6	6	6	6
C	18	24	30	36	18	24	30	36
D	10	10	10	10	10	10	10	10
E	91	91	97	103	95	95	101½	107½
F	8	8	8	8	8	8	8	8
G	4½	4½	4½	4½	4½	4½	4½	4½
H	12½	12½	12½	12½	13¼	13¼	13¼	13¼
J	29	29	29	29	31¼	31¼	31¼	31¼
K	40	40	40	40	47½	47½	47½	47½
L	11½	11½	11½	11½	13½	13½	13½	13½
M	25	25	25	25	29	29	29	29
N	14	14	14	14	14	14	14	14
O	46	46	46	46	45¾	45¾	45¾	45¾
P	3½	3½	3½	3½	3½	3½	3½	3½
Q	21	15	9		21	15	9	
R	8	8	8		8	8	8	
S	21	21	21	21	25	25	25	25
T	6	6	6	6	6	6	6	6
V	5½	5½	5½	5½	7¾	7¾	7¾	7¾
W	2850	2950	3050	3150	5150	5200	5300	5400
X	2900	3000	3100	3200	5200	5250	5350	5450
Y	3000	3100	3200	3300	5300	5350	5450	5550
Z	126	126	133	140	158	158	175	186

SPECIFICATIONS

	DLKC2-5	DLKC2-15
MAXIMUM WORKING CAPACITY, TONS	5	15
CYLINDER BORE, INCHES	3.75	6
RAM SPEED DOWN FT. PER MIN.	19	19
RAM SPEED UP FT. PER MIN.	42	35
PUMP VOLUME GALLONS PER MIN.	11	28
MAXIMUM WORKING PRESSURE P.S.I.	900	1060
MOTOR HP 1200 R.P.M.	5	15
RAM DIAMETER INCHES	2.75	4.25
RAM THREAD FEMALE SIZE, PITCH,	1⅜-12	2-8
OIL RESERVOIR CAPACITY, GALS	35	50

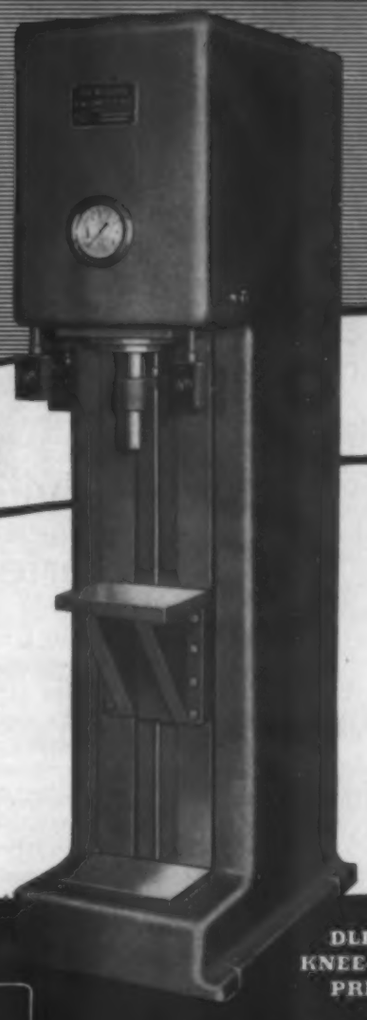
Whatever You Need POWER, SPEED and CONTROL Check ✓

DENISON EQUIPMENT in APPLIED HydrOILics

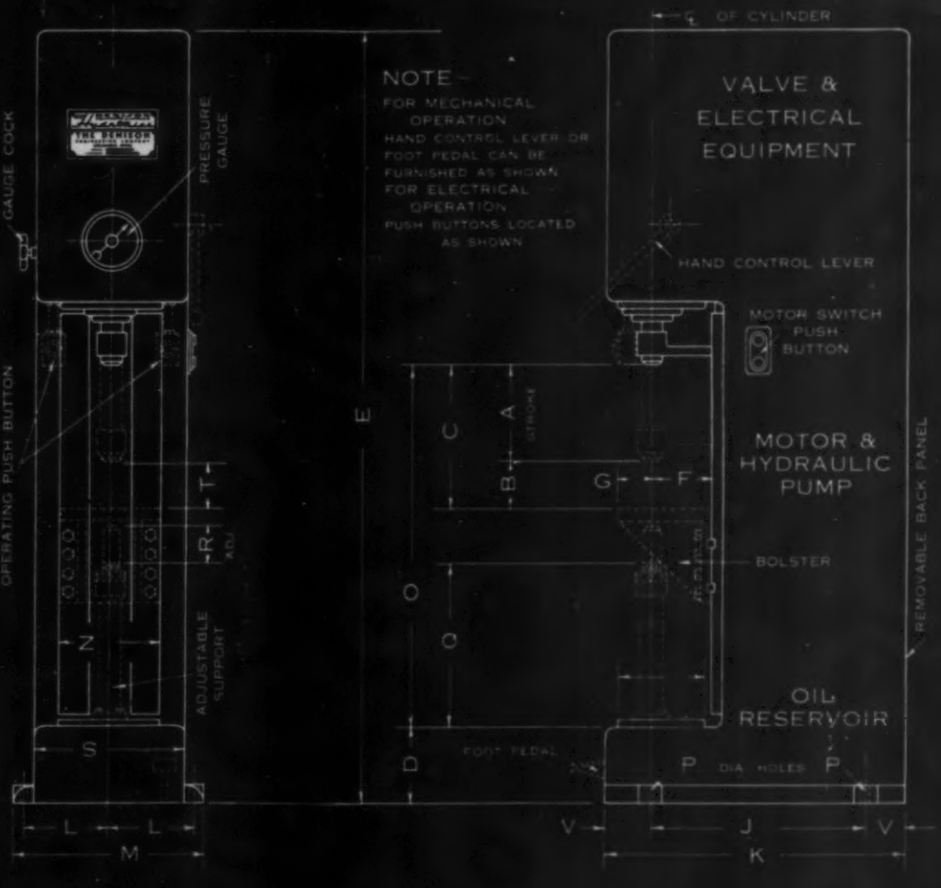
SPEED SMALL-LOT PRESSING

The DLKC2 5- and 15-ton Capacities

HAVE YOU sent for your free copy of the new DATA BOOK on Denison's full line of 5-to-100-ton HydrOILic Presses for straightening, assembling, bending, broaching and other pressing operations? It is pointing the way to better pressing results in hundreds of plants. Also contains 12 full pages of useful engineering data! A request on your business letterhead will bring it by return mail. Write today!



DLKC2 KNEE-TYPE PRESS



CAPACITIES: 5 and 15 TONS

MANUAL OR ELECTRIC CONTROLS

MAX. WORKING PRESSURE: 1,000 p.s.i.

MAX. STROKE 30"

MAX. THROAT OPENING: 8"

MAX. VERTICAL OPENING: 46"

DENISON ENGINEERING COMPANY
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of all those opposing his policies in order to hasten the end of the present war.

Mr. Murray declared, "The most important elections of American history take place two weeks from today. The result of these elections will determine the kind of Congress that will run the legislative branch of our government in our country's toughest war,—the war of survival." He said it will be essential to have only those men in Congress who support the President's policies and who will not delay war measures desired by the administration. He called for the defeat of all congressmen who have "sponsored and fought for viciously repressive laws aimed at labor."

Durable Civilian Goods Plants 91% Converted to War Production

AUGUST reports by 3021 manufacturing plants in 74 metalworking industries show that production of durable goods for civilian use had ceased almost completely at the end of the summer. Of unfilled orders held by these plants, amounting to over $26,000,000,000, 91.2 per cent was for war goods. The surviving trickle of nonmilitary production was chiefly of repair and replacement parts needed to keep essential civilian services in operation.

In many of these plants full conversion has been achieved; employment is back to normal, or higher, and from them flows a swelling stream of war goods. In others, the work of conversion still is in progress; and peak war output will not be reached for some time.

In most of these industries, war goods represent entirely new products, but in some the normal product is an important military item. Where this is the case, conversion of the manufacturing plant, obviously, has not been necessary.

Biggest consumers' durable goods industry was the automobile industry. In the "model" year of 1941, it turned out five million vehicles, which sold at the factory for just over four billion dollars. Employment was around 500,000 wage earners.

When production of automobiles ceased in February, conversion of the automobile plants was begun. Production lines were torn up, plant layout changed, machines adapted to new uses.

At the end of July, the automobile industry reported unfilled war orders amounting to over $13,000,000,000. This was more than 98 per cent of all orders on the books. Shipments for July were $533,000,000. At this rate, it would take over two years to fill these war orders, but production is increasing steadily. Employment in August reached 641,000, topping the peacetime peak by more than 100,000.

The manufacturing capacity of the automobile industry is by no means fully utilized as yet. For the remainder of this year, throughout all of next year, and even in 1944, many plants in the industry will be working up to peak performance on their present commitments for the production of war materials.

Next to automobiles, the domestic mechanical refrigerator industry was the largest producer of consumers' durable goods. When production of domestic refrigerators ceased at the end of April, the industry turned to conversion. At present, employment is back to normal, and early next year, it is estimated, will be almost doubled. The industry is producing a great variety of munitions items, including parts for aircraft (notably propellers), parts for tanks and guns, parts and equipment for marine vessels, communication equipment, machine guns, ammunition and small arms. One plant will produce Vought-Sikorsky flying boats. At the end of July the industry held unfilled war orders valued at $450,000,000.

Washing machine and ironer industry employed 13,000 wage earners in 1941 and produced $112,000,000 worth of goods.

Convert to War Output

Converted to war production early last year, shipments in March were $321,000; in July, $3,839,000. Unfilled orders at the end of July totaled close to $80,000,000, of which 99.5 per cent was for war goods.

Household electrical appliance industry in 1941 employed over 11,000 wage earners and produced goods to the value of $75,000,000. There were 145 firms in the industry, but 40 of them did about 90 per cent of the business.

In this industry almost complete conversion was necessary. Normal products found no military use. During the summer, employment fell off sharply but is now near normal. Shipments of war goods increased from $3,644,000 in May to almost $10,000,000 in July. Unfilled war orders in 32 plants at the end of July amounted to $204,066,000, of which 99.7 per cent was for war goods—chiefly munitions.

Twelve firms in the bicycle industry made about 1,800,000 bicycles in 1941. Two firms in the motorcycle industry made 28,000 motorcycles. Employment in the two branches of the industry was in the neighborhood of 8000 wage earners and the value of products approximately $45,000,000. A limitation order was issued in March which cut production of bicycles to 42 per cent of the 1941 date, and prescribed specifications for a standard model popularly known as the "Victory" model.

With the creation of the standard model and curtailment of output, the larger manufacturers began to take on war work and in July were producing parts for aircraft, small arms and marine vessels; ammunition, and sighting and fire-control equipment.

The motorcycle end of the industry presents an entirely different picture. No conversion has been necessary; on the contrary it has been necessary to increase as rapidly as possible the production of motorcycles to meet the demands of the services, chiefly of the Army. The two motorcycle firms have Army contracts calling for the production of 33,000 motorcycles by each firm in 1942.

Oil burner industry had grown to be an important one in which, in 1941, 11,000 wage earners were employed and goods to the value of $90,000.000 were produced.

As early as last March this industry shipped a million dollars' worth of war goods and the fact that this was 65 per cent of total shipments indicates that the industry was already heavily engaged in war work.

Conversion of the plants producing residential oil burners will be largely completed by the end of the year and this will result in a substantial rise in munitions shipments.

In 1941, the radio industry manufactured 11,000,000 home radios and 2,600,000 automobile radios, having a factory sales value close to $235,000,000. The 52 firms in the industry employed about 35,000 wage earners.

In a broad sense, conversion has not been necessary in the radio industry since military demands are extremely heavy for many kinds of radio communication equipment and other applications of radio technique. The radio industry, which last year was doing a business of about $20,000,000 a month, is now well over $100,000,000 a month. Unfilled war orders are in excess of $4,000,000,000, and the bulk is for radio equipment.

Edwin H. Brown Succeeds Watkins

EDWIN H. BROWN, Milwaukee, vice president in charge of engineering, Allis-Chalmers Mfg. Co., has been appointed assistant chief of the Iron and Steel Branch in charge of the Plant Facilities Section. He succeeds Don N. Watkins, who has resigned to return to his position as president of Steel Publications Inc., Pittsburgh.

C. H. Matthiessen Jr, assistant director general for operations, has resigned to return to his home on the Pacific Coast. It is expected he later will do some work for the WPB on the west coast.

Walter E. Heller, president of Walter E. Heller & Co., Chicago and New York, has been appointed chief of the Materials Program Branch of the Program Co-ordination Division.

Edwin H. Brown

C. H. Bradley Heads Distressed Steel Unit

C. H. Bradley, president, W. J. Holliday & Co., Indianapolis steel warehouse firm, has been named chief of the Distressed Steel Stock Section of the Iron and Steel Branch, WPB.

Mr. Bradley succeeds Ralph J. Stayman who has returned to his post with the Carnegie-Illinois Steel Corp.

As now set up, the organization for unfreezing millions of tons of steel held in idle inventories consists of three agencies, the Materials Redistribution Section of WPB, the Distressed Steel Stock Section of WPB, and the Steel Recovery Corp.

The Materials Redistribution Section's activities are concerned with the location of idle stocks. It sends out questionnaires and tabulates the information obtained from them. The Distressed Stock Section is concerned with the disposal of steel which can be readily utilized in manufacturing industry. The Steel Recovery Corp. will purchase and dispose of as scrap all steel, either fabricated or semifabricated which cannot be utilized by manufacturers.

Additional Advisory Committees Appointed

New industry advisory committees organized in the metalworking field by the War Production Board include:

Lathe Chucks

Franz T. Stone, chief Industrial Specialties Branch, Tools Division, is government presiding officer.

Committee members: A. P. Barnaskey, Westcott Chuck Co., Oneida, N. Y.; L. W. Greenberg, L. W. Chuck Co., Toledo, O.; H. S. Hubbell, T. R. Almond Mfg. Co., Ashburnham, Mass.; Carl S. Newmann, Union Mfg. Co., New Britain, Conn.; Joseph C. Regan, E. Horton & Sons Co., Windsor Locks, Conn.; Harry Sloan, Cushman Chuck Co., Hartford, Conn.; A. E. Thornton, Skinner Chuck Co., New Britain, Conn.; L. E. Whiton, D. E. Whiton Machine Co., New London, Conn.

Industrial Vacuum Cleaners

N. G. Burleigh, chief, Services Branch, is government presiding officer.

Committee members: W. C. Gargmour, Airovac Co., York, Pa.; J. R. Morgan, American Vacuum Cleaners Co., Chicago; Dewey I. Doyle, Doyle Vacuum Cleaner Co., Grand Rapids, Mich.; Gordon E. Kent, Kent Co. Inc. Rome, N. Y.; R. H. Liessman, Invincible Vacuum Cleaner Co., Dover, O.

Nonferrous Scrap

Paul C. Cabot, deputy director, Conservation Division, is the government presiding officer.

Committee members: William Abramson, A. Abramson & Sons Inc., Newark, N. J.; Elias Bernstein, Elias Bernstein Co., New York; Leo J. Kelleher, Southern Converting Co., Greensboro, N. C.; Louis B. Cline, Cline & Bernheim, Nashville, Tenn.; George Birkenstein, George Birkenstein Corp., Chicago; Herman Ladenson, Ladenson Metals Corp., Philadelphia; Milton Levenson, Roxbury Iron & Metal Co., Dorchester-Boston, Mass.; Sol Levine, Peoples Iron & Metal Co., Chicago; Ben Miller, Eureka Iron & Metal Co., Los Angeles; Hyman Moskowitz, Moskowitz Bros., Cincinnati; Nathan Trottner, Trottner Iron & Metal Co., San Antonio, Tex.; Joseph H. Tyroler, Tyroler Metals Inc., Cleveland; Hyman Viener, Hyman Viener & Sons, Washington.

Plumbing and Heating Transportation

Henry S. Norris, Plumbing and Heating Branch, is the government presiding officer.

Committee members: L. S. Berne, Hotstream Heater Co., Cleveland; J. A. Brough, The Crane Co., Chicago; C. C. Craft, Iron Fireman Mfg. Co., Cleveland; Clem W. Gottschalk, Jones & Laughlin Steel Corp., Pittsburgh; S. J. Hoehnke, Kohler Co., Kohler, Wis.; George W. Hoel, The Trane Co., La Crosse, Wis.; X. W. Lutton, Universal Sanitary Mfg. Co., Camden, N. J.; M. T. Northey, Minneapolis-Honeywell Regulator Co., Minneapolis; E. T. Scheck, L. J. Mueller Furnace Co., Milwaukee; Benjamin S. Thomas, American Radiator & Standard Sanitary Corp., Pittsburgh; F. H. Tierney Reeves Steel & Mfg. Co., Dover, O.

Steel Strapping

L. F. Miller, Iron and Steel Branch, is government presiding officer.

Committee members: H. C. Bristoll, The Stanley Works, New Britain, Conn.; John W. Leslie, Signode Steel Strapping Co., Chicago; C. F. Osgood Jr., C. Tennant Sons & Co., New York; C. J. Sharp, Acme Steel Co., Chicago; E. T. Sproul, Brainard Steel Co., Warren, O.; Harry Walter, Gerrard Wire Co., Chicago.

Oxy-acetylene Apparatus

John Gammell, chief, Electric Power Section, General Industrial Equipment Branch, is government presiding officer.

Committee members: Harry H. Reade, Air Reduction Sales Co., New York; L. D. Burnett, Linde Air Products Co., New York; A. J. Fausek, Modern Engineering Co., St. Louis; E. A. Daniels, Victor Equipment Co., San Francisco; E. L. Mills, Bastian-Blessing Co., Chicago; L. L. McBurney, Smith Welding Equipment Co., Minneapolis; Lorn Campbell Jr., Harris-Calorific Co., Cleveland; Philip Kearny, K-G Welding & Cutting Equipment Co., New York.

Contract Renegotiations May Be Consolidated

Manufacturers whose overall profits are under review by governmental price adjustment agencies will not be subject to simultaneous review of individual contracts by contracting officers, according to a joint statement issued by the price adjustment boards of the Army, Navy and Maritime Commission.

This policy is designed to eliminate duplication by permitting companies to consolidate all their individual contracts for review, on an overall basis, by the price adjustment agency assigned to them, instead of having each individual contract reviewed by contracting officers.

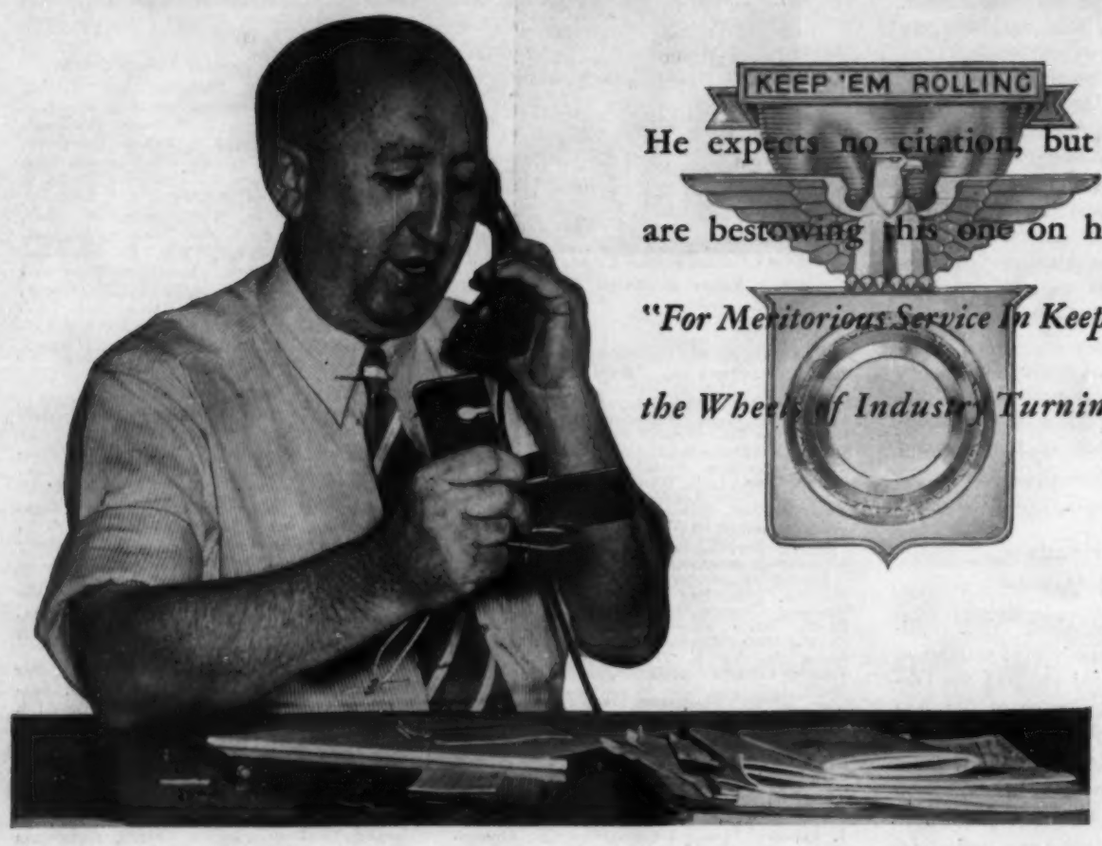
Contracting officers will be informed when overall review has been started in order that companies will have only one group with which to deal. Contracting officers also will be notified when review has been concluded and an agreement reached with a company by any price adjustment board, section or branch. Thereafter, while contracting officers may enter into new contracts, they will not seek price reductions on existing contracts except on deliveries to be made after the expiration of the period covered by the agreement. However, should the company find that profits for the balance of the period covered by the agreement are proving higher than contemplated at the time of the agreement, it may volunteer further price reductions.

The three price adjustment boards announced that they regard voluntary renegotiation of contract prices as part of the normal procedure of orderly and economical procurement, irrespective of statutory provisions. Periodical review of production costs and contract prices, and adjustment thereof by agreement, is inherent in any contracting situation.

Indexes of value of iron and steel manufacturers' inventories were 134.6 in August and 133.9 in July, compared with 126.5 in August a year earlier, using the 1939 average month as 100.

HYATT SALUTES THE MAINTENANCE MAN—

HERO in the BATTLE of PRODUCTION



He expects no citation, but we are bestowing this one on him:

"For Meritorious Service In Keeping the Wheels of Industry Turning."

HIS IS A VITAL JOB. He may be Master Mechanic, Maintenance Superintendent, Chief Engineer, Plant Engineer, Millwright Foreman or carry no particular title at all. But he's a mighty important factor in America's all-out war effort.

He doesn't design the guns, ships, planes, tanks, trucks, etc.; neither is he accredited with their "beat the production" schedules. But when machines of war roll off the assembly lines, he's the fellow behind the scenes who keeps them rolling.

He's one of the unsung heroes of this battle of production. He symbolizes a whole army of quiet, determined men who are driving home the terrific power of American efficiency with cool but furious intensity.

We know him well... industry's man of war. We've worked with him in less troubled times and we meet him regularly now in our job of supplying bearings for America's hard-hitting planes, guns, tanks, ships, and trucks; and for the steel-sinewed machine tools, cranes, motors, and so on with which they are produced.

It's he who keeps the wheels of industry turning... he whom we salute... he upon whom all of us so much depend for ultimate Victory!

Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

THE 50TH YEAR OF HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Generals feted as Ordnance Department officially christens new tank-automotive center. . . No decision on tank engine as yet. . . Materials distribution is headache of the moment

THIS city is now the official headquarters of all procurement and engineering activity on motive ordnance for the military machine. Decentralization of this work from Washington was signalized last week as Maj.-Gen. Levin H. Campbell Jr., chief of ordnance, formally opened offices of the department's tank-automotive (formerly combat-automotive) center in the ornate downtown Union Guardian building. The center now is the office of the chief of ordnance, with Brig-Gen. Alfred R. Glancy, former General Motors official, a deputy chief. Assisting him are two other Brig.-Gens., Donald Armstrong, formerly head of the Chicago ordnance district, and John K. Christmas, tank expert in the ordnance department.

The four generals were guests of honor at a dinner a week ago Sunday night, with 75 executives of war production plants in this area in attendance. Arranged by the Automotive Council for War Production, the dinner was presided over by Alvan T. Macauley of Packard, and Robert F. Black of White Motor, the latter toastmaster.

Principal speaker at the "ordnance rally" was C. C. Carlton, vice president of the ACWP and of Motor Wheel Corp., who described the evolution of the co-operative effort on which the motor industry and 300 allied manufacturers embarked a year and a half ago. The ACWP was an outgrowth of an earlier co-operative organization known as the Automotive Committee for Air Defense, set up in October, 1940, to assume the manufacture of 500 million dollars worth of aircraft subassemblies in the two-billion dollar bomber program then being planned. At the time, Brig.-Gen. Jimmie Doolittle was the liaison officer between the group and the Air Forces. Col. Alonzo M. Drake now is head of the Air Force central procurement office located here, and the old ACAD has matured to an industry-wide co-operative encompassing all phases of war production.

As Mr. Carlton told his audience, the companies making up the ACWP now have about 25 per cent of the business placed by the Ordnance department in 1942, the total being around 32 billions. Ordnance is the motor industry's biggest customer now, accounting for nearly half of its cumulative total of 15 billions in orders and monthly shipments of 500 millions.

As industry and the generals feted, technicians were working throughout the week-end putting final touches on the extensive quarters to be occupied by the Glancy-Armstrong-Christmas crew. Service men spent a part of their time rewiring and installing secret dictaphone equipment on telephones in certain offices, apparently on instruction of army intelligence. A story current in Washington is to the effect that all telephone calls to military officials should be concluded with the postscript, "Good-bye, G-2." Doubtless this will soon apply to Detroit.

Output Drops After Transfer

Major-General Campbell addressed a packed luncheon of the Economic Club here Monday and paid high compliments to his assistants, at the same time emphasizing the importance of the Ordnance decentralization now effected.

Though it may be only a coincidence, one of the first impacts of the transfer of the tank-automotive center to Detroit was an appreciable reduction in output of these items. This had been expected as a part of the overall effort to bring war production into better balance, but it is a different thing to explain to men working in these plants, as well as to suppliers who have had to do considerable readjusting in delivery schedules on some materials and parts. General Campbell told a press conference he hoped to have this situation corrected within 90 days, although he admitted emphasis on planes may slow down tank production.

The ordnance chief said standardization on one type of engine for medium tanks was the hope "before long". This has not been done as yet because existing plants could not turn out enough engines for the tanks being assembled, and ordnance experts have not yet decided which of the four types of engines now being built is the best. These four plants are: A 9-cylinder radial aircraft-type engine; a twin-diesel unit; a grouping of five 6-cylinder automobile engines, and an 8-cylinder liquid-cooled aircraft-type engine.

General Campbell said it was the intention to concentrate on present tank designs and to build larger ones only experimentally. He added that larger models, such as the proposed 60-ton land dreadnaught, have a number of disadvantages (an obvious one being transportation to the battlefront) and consume a disproportionate amount of material for their effectiveness.

There has been criticism leveled at the

TANK DESTROYER HEAVILY ARMED WITH RIVETED PLATE

ONE of the hard-hitting tank destroyer, or TD type of armored vehicles, being produced by Marmon-Herrington Co. Inc., Indianapolis, as it goes through its paces on sandy test track. Hull is fully armored with riveted plate. Top turret carries a cannon and machine gun, while another gun is mounted on the sloping front of the hull. Drive is through rear track, and an unusual degree of speed and mobility is attained in the design

M-3 tank and its successor, the M-4, in the medium size range. A Russian general claimed they were too high off the ground, the treads were too narrow, and they were a fire hazard because of the use of high-volatile aviation fuel. The M-4 design went at least part of the way toward correcting these criticisms, except for the matter of fuel. General Campbell is quoted as saying that aviation fuel is no more hazardous in-tank use than diesel oil, and that the M-4 silhouette can be lowered no further if 14-inch ground clearance is to be maintained. The 75-millimeter cannon on this tank has been improved by lengthening the barrel to raise muzzle velocity and hitting power.

A criticism which still holds is the failure to armor the treads and bogie mechanism on the sides. The easiest way to stop a tank is to cripple the track on either side, and this can be done by lucky shell hit or by sneaking a rail or bar across the moving track. It would appear that a simple armor shield might be mounted over the sides without unduly increasing weight and at the same time providing protection to the suspension system and drive mechanism.

"Detroit Plan" Well Supported

The so-called "Detroit plan" for distribution and allocation of materials to war production plants, discussed locally and in Washington since August, is now battling it out in the WPB with the PRP plan and the later "budget system" of allocations proposed by Ferdinand Eberstadt (STEEL, Oct. 19, p. 45). The industry here is solidly behind its own plan which has been likened to a "warrant" system or vertical cartels such as are used in Germany for control of materials. Principal advantage of the Detroit plan is that it would permit industry to order steel and other materials in advance of clearing requirements through the clerical detail and paper work at Washington.

Chief criticism of the motor industry's proposal is that it would freeze prime contractors to suppliers and shut out small buyers. A compromise between the Eberstadt plan and the Detroit plan seems to be the likely outcome, but there has been no official pronouncement as yet. A half dozen of the top-flight motor executives rushed down to Washington Oct. 9 in the Ford Motor Co.'s private plane to impress the need for immediate action on the materials question.

Basically, what the auto industry and its allied manufacturers want is a predetermination of the quantities of various war products to be ordered, on the basis of availablity of materials. This would be a fine thing if it could be done, but consider a hypothetical case, typical of what has happened in recent months in this industry:

A company is approached to manufacture, say, an antiaircraft gun. Its engineers study the problem, the tooling, the choice of materials and finally announce that in 60 days they can be building 10 guns a day. Then the War Department says, "Fine, here is an order for 1000 guns, or enough to keep you going for three weeks, with a little margin."

Whereupon the manufacturer goes out and buys materials for 1000 guns, but specifies deliveries over a two-month period, to maintain a float. Then, by dint of exceptional ingenuity and application on the part of the master mechanics, tool engineers and machine operators, the company starts making 5 guns a day after only 30 days start, and by the time the original estimate of 60 days has passed production is up to 20 guns a day. The hard-pressed materials suppliers are hounded by follow-up men to get their stuff in ahead of original requirements, but still cannot keep up with the doubled production rate which the manufacturer has been able to achieve.

The manufacturer then gets the Army-Navy E for excellence of production and is toasted throughout the country for achieving the impossible. At the same time he is running out of materials because his first estimate did not take into account the extra "oomph" which has been given to production. He then raises hell with suppliers and tells them production is going to be slowed down if they don't come through. Men will have to be laid off and their morale will sink to low ebb. The materials supplier is powerless; he replies that the WPB tells him what he can do and cannot do. So the manufacturer rushes to Washington and says that, by gosh, if something is not done to straighten out the materials picture, then his production is going to fall way off and men will be out of jobs.

Suggests Freezing Production Rate

If you can straighten out that mess, you are wanted in Washington, and in a hurry. One fairly simple procedure might be to tell prime contractors that when their original estimated production rate on any specific item has been reached, they are to go no further, because this rate is frozen absolutely to materials supply and, no matter how remarkable it might be for this established rate to be exceeded, to do so would throw the complete production picture out of focus. Let the Army-Navy E be awarded for reaching a production rate on time—not too soon or not too late—and for holding that production rate as set up in original estimates before placing of a contract!

Through adoption of wood as a substitute for steel in cargo bodies of army trucks, builders of this equipment expect to save more than 275,000 tons of steel annually, though this figure may have to be shaded because of sharply curtailed truck production. With the exception of trucks designated as special equipment carriers, all units of 1½-ton size and larger now being produced are equipped with wood bodies. About 1000 feet of various types of lumber are used in the average cargo body, which is reduced in manufacturing processes to 450 feet, or a scrap loss of 550 feet per body.

General Motors' V Loan

General Motors is completing arrangements for $1,000,000,000 revolving war credit or V-loan under an agreement with 400 banks, extending over the next 3½ years. The credit is being made available because of greatly increased demands on working capital funds to carry inventories and receivables, which are far in excess of normal levels. Although the amount stated is one billion dollars, it is pointed out this does not mean the corporation will necessarily borrow the maximum amount, or will be required to do so. It simply means that the corporation will have available to it on call at any time within the next 3½ years all the resources it may need for the maximum war production effort. Interest is at a rate of 2½ per cent a year on amounts borrowed, plus a commitment fee of ⅛ per cent per year on the unused portion of the maximum credit.

Representatives of about 25 leading manufacturers in the Detroit area met with the staff of the local WPB office last week to hear a review of the WPB program and to present questions on various phases of its activities.

Multiplicity of agencies dealing with the disposal of excess stocks of steel or fabricated parts in inventory is confusing to industries here. At least four separate groups are attacking this problem by the usual device of the questionnaire, seeking information on the quantity and type of steel stocks on hand. Steel Recovery Corp. is said to have distributed 26,000 of its first questionnaires to the nation's blacksmiths alone!

After Nov. 15, anyone who leases a commercial motor vehicle "for a period of seven or more consecutive days" must obtain a Certificate of War Necessity to operate the leased vehicle, the Office of Defense Transportation announced.

★ *Woodworth employs a nearly equal number of men and women. By Mid-Winter, personnel records will show 80% women and 20% men.*

TO N. A. WOODWORTH MEN AND WOMEN FOR *"Outstanding War Work"*

Men and women of N. A. Woodworth Company have received the only military decoration given to civilians, the Army-Navy "E" Award. ★ ★ ★ This signal honor has been accepted with sober consideration of the greater responsibilities it demands. Having publicly acknowledged our production accomplishments, the Army and Navy expect us to maintain and even surpass past efforts as America's Armed Forces step-up the military pace against Axis aggression.

★ ★ ★ Mighty bombers, deadly fighter planes are impotent if integral engine parts fail to stand the stress of combat flying. In manufacturing over 100 highly precisioned engine parts, Woodworth employes keenly feel their responsibility in this country's war effort. ★ ★ ★ Management and labor are pledged and anxious to meet any new production goals and mechanical requirements set forth by the Army and Navy to always be worthy of the "E" Award.

N. A. WOODWORTH COMPANY

AIRCRAFT ENGINE PARTS • PRECISION TAPS • HEAT TREATING, PLATING • PRECISION GAGES

FERNDALE, MICHIGAN

WING TIPS

Major Seversky replies to critics. Urges "tough realism" in recognition of past errors and present shortcomings in military aviation. . . Will there be multiplace fighters in near future?

MAJOR ALEXANDER P. DE SEVERSKY, who has done perhaps more than any other single individual to awaken public interest in military aviation through his critical analyses of alleged deficiencies in American air power, takes exception to remarks by Don R. Berlin, General Motors aeronautical engineer, published in Wing Tips, Sept. 14. Mr. Berlin's comment took the form of a rebuke to the major for aspersions cast on Air Force generals, and a defense of the P-40 pursuit ship design which Mr. Berlin fathered.

The major supplies a copy of his official reply to Mr. Berlin in which he points out that his quarrel is not with Mr. Berlin but with those "in high places" who set unrealistic conditions to be met by designers of pursuit airplanes.

"The tragedy," Major Seversky continues, "was that both he (Mr. Berlin) and I were forced by limited minds to design planes for a three-mile ceiling, when all other nations were building for five-mile ceilings. We were told not to use more than two guns and were prevented from putting on adequate armor. The very conception of a pursuit ship which is now hailed as the main hope of our fighter command was outlawed when I proposed it years ago. Why? Because it was not equipped with the pet engine which had been arbitrarily and mysteriously given a monopoly.

"I fear we shall continue to be also-rans in the race for aviation leadership until we bring tough realism to bear. We must recognize past errors and present shortcomings, and stop this dangerous nonsense of saving face for firm and individuals who blundered, even if their motives were impeccable. Personally, I shall continue to expose aeronautical blindness and every attempt to kid the American people about some of their airplanes. It's the least I can do for the country I love deeply."

At the time Mr. Berlin's comments were published, it was suggested by STEEL that perhaps "past errors and present shortcomings" had in fact already been recognized, but that demands of military secrecy prevented disclosure of all details from the public, even as a means to bolster civilian morale.

On this score, Major Seversky writes, "On the question of morale, I can only add this. If, due to complacency and isolationistic ideas in peacetime, we built bows-and-arrows, so to speak, instead of rifles, would it help morale to tell the people that bows-and-arrows were really better? Those who have to do the fighting would learn soon enough that the enemy had the advantage with his firearms. It is my belief that such a policy would lead only to a loss of faith in our leadership and possibly even in our democratic form of government."

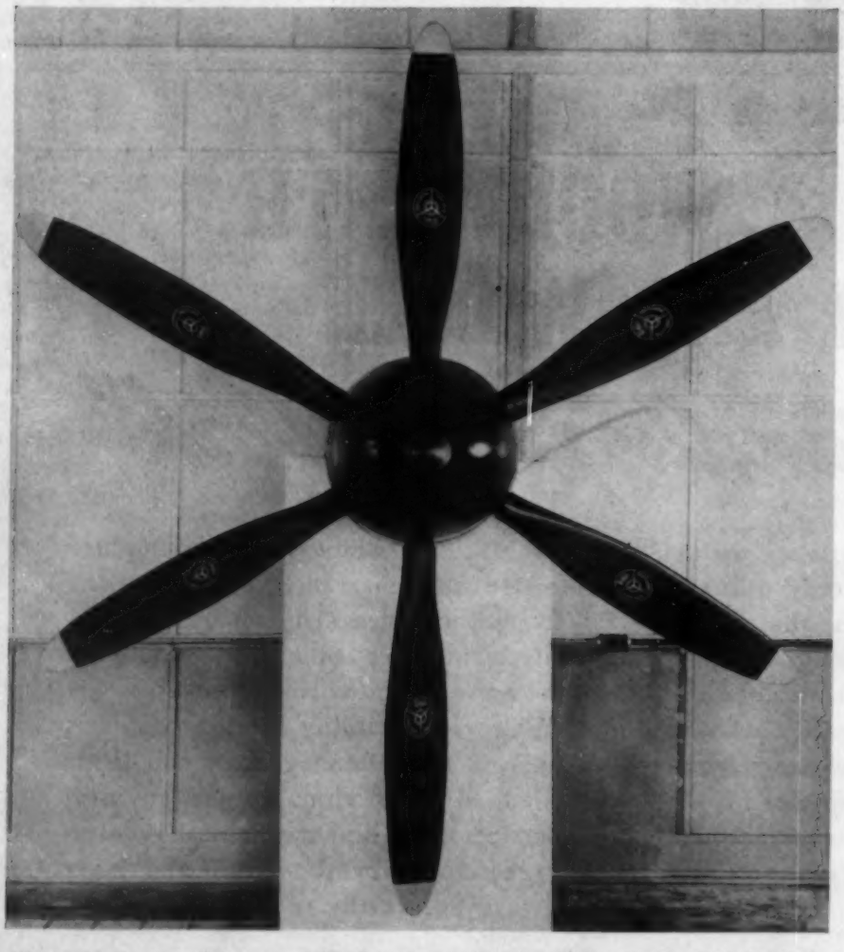
Details of the eventful career of Major Seversky are so well known as to preclude repetition here. However, the following paragraph from the appendix to his official biography supplied by the Ligue International des Aviateurs, is of more than passing interest:

Major Has Many "Firsts"

"Major Seversky was the first man in the world to recognize the necessity of long-range fighters and the first to define them as convoy fighters, not only for interception of aircraft a long way off, but also for the accompaniment of bombardment missions. He was the first to design such long-range single-seater and two seater fighters. To demonstrate the practicability of his ideas, he and other pilots broke a number of long-distance speed records in these fighters. Since the war, the necessity for convoying bombardment aviation has become apparent. Now all nations, including our own, are feverishly working on the development of this type of aircraft."

So far as is known officially, the U. S. Air Forces operate no long-range fighters as yet, except for standard fighters equipped with auxiliary gas tanks which can be jettisoned when empty; and fur-

SIX HOLLOW STEEL BLADES ON DUAL ROTATION PROPELLER



DUAL rotation airplane propeller has been developed by Curtiss-Wright Corp. to increase the speed and efficiency of American fighting planes in high-altitude flying. The complete unit consists of two hollow-steel three-blade propellers which rotate in opposite directions. It is said to be the first of its type to utilize electric control of blade pitch. NEA photo

Shells · IN SECONDS .. INSTEAD OF MINUTES

SUNICUT helps shell plant run complete 8-hour shifts without tool change or regrind

Shells that a short time ago required minutes to machine now are produced in seconds.

At one of America's great armament plants, batteries of automatics are turning out shells on a 'round-the-clock schedule, running complete 8-hour shifts without a tool change or regrind, and Sunicut, the transparent, sulphurized cutting oil, is a vital contributing factor.

Sunicut was adopted at the recommendation of Sun Oil Engineers—those well-known Doctors of Industry. Its success has been phenomenal. Sunicut's exceptional heat-absorbing and metal-wetting qualities permitted the increased tool life, fine finish and "nth" degree accuracy that made this production possible.

Get more production per shift in your plant. A Sun Doctor of Industry is ready . . . willing . . . and able to help you. Call on him today. For other examples of how Sun Engineers and Sunicut are helping industry step up production for victory, write for free copy of "Helping Industry Help America."

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SUNOCO

SUN PETROLEUM PRODUCTS

HELPING INDUSTRY HELP AMERICA

WAR BONDS
STAMPS

thermore all present types of fighters are of the single-seat type.

Sketchy details of one multiple fighter —the Bell FM-1 or Airacuda—have been published some time ago, but this was purely on an experimental or "Y" model. It is a 5-place fighter with two liquid-cooled engines mounted in wing nacelles and driving pusher-type propellers at the trailing edge of the wing through extension shafts. Cannon are mounted in the nose of each nacelle, operated by gunners stationed there. The central fuselage is equipped with defensive machine guns, bomb racks, etc., and is manned by a crew of three. According to Aerosphere, this model has all compartments heated, with provisions for oxygen at high altitudes. An auxiliary power plant drives nine electric motors which supply power for radio, lighting and heating, operation of wing flaps, engine starter and retraction of the landing gear.

More and more the necessity appears for pretesting of both aircraft parts and operators under wide ranges of temperature encountered in global and stratospheric warfare. One of the latest devices designed to facilitate this work is a stratosphere chamber for testing mechanical parts of aircraft, including radio equipment, in the temperature range of —75 to 200 degrees Fahr., built by the Kold-Hold Mfg. Co., Lansing, Mich. The unit has an interior chamber volume of about 245 cubic feet, in which pressure, as well as temperature, has varied, the former from ambient at the location of the unit to 3 inches of mercury absolute. Humidity control likewise is flexible, from 25 to 95 per cent, relative to all temperatures above 40 degrees, or at a fixed bottom temperature of 32 degrees. Three indicating recorders are provided for continuous record of temperature, pressure and humidity. Twelve mechanical connector shafts extend through the outer shell of the chamber, and 18 electrical connections are provided inside. First of the units went to Philco at Philadelphia for testing radio parts for bombers.

From a plant "somewhere below the frostline," flying cargo boats soon will be emerging from final assembly operations, under supervision of Nash-Kelvinator, erstwhile builder of automobiles and refrigerators. Virtual duplicates of Vought-Sikorsky 44-A flying boats already in transoceanic service, the craft

AIR-TIMED AUTOMATIC RIVETING GUN CONTROLS WORK OF NOVICES

MANUFACTURING and selling rights have been purchased by the Chicago Pneumatic Tool Co. on the newly developed Murray Time-Air device which mechanically assumes one of the most critical parts of aircraft riveters' work—determination of the proper riveting time cycle.

Developed in the research division of Murray Corp of America, Detroit, under direction of Alfred Haberstump, the light compact unit is attached to the handle of a portable riveting gun and can be operated either automatically or manually. Employed automatically, the trigger is depressed fully and the timer delivers a predetermined time cycle and then stops, thus producing rivet bucktails of uniform height and diameter. This is said to insure uniform riveting when several rivets were driven in sequence and to avoid the usual rehitting or overhitting which requires drilling out and replacement of rivets.

When the operator pulls the trigger slightly back, the hammer operates as long as the trigger is held in this position, thus permitting trim-up or an occasional longer cycle; or the trigger can be released at any time, providing for a trim-up cycle.

Time cycles are easily set by turning a small adjustment dial, and pressure control may be regulated for thin or soft material. The operator can set the time cycle on a production panel without the loss of time or rivets, by using the trim-up feature and gradually adjusting the dial until the proper time cycle is reached.

The device can also be used on pedestal riveters, in which case it is operated by a foot pedal control.

The simplicity of operation reduces the training period for unskilled workers.

After five months of tests the Ford Willow Run bomber plant, working in conjunction with the research division engineers of the Murray Corp., has placed orders for a number of the "automatic riveters."

Proper riveting time cycle is predetermined by this new accessory for riveting guns used in aircraft assembly work. It aids uniformity of riveting and avoids rehitting and overhitting. Projecting Cleco pins in one view are used to hold assembly firmly prior to driving rivets

are said to have the longest range of any ships of their type. Indication of their size can be gained from the fact that pontoons alone are nearly as large as the fuselage of the average pursuit.

Parts and subassemblies are being fed to the final assembly plant by a chain of Nash plants in Michigan and Wisconsin. Since the boats must be launched from water, the reason for assembly below the frostline is fairly obvious.

Leading builders of combat airplanes now are all operating so-called Modification Centers—specially equipped and staffed operational centers where warplanes are given extra fittings and otherwise made ready for service on some specific battlefront.

Locations of these centers established last December, are naturally shrouded in secrecy, but they are busy day and night fitting out planes for battle duty. By maintaining such centers, production is not slowed at the major producing plants because of the need for some special installation on certain groups of planes. Output is transferred from the final assembly departments directly to the Modification Centers where special gun installations, auxiliary gas tanks, special painting for desert operations or other "extras" are added.

Wright Aeronautical Corp. is now building its sixth huge engine assembly plant "somewhere in New Jersey". The structure—single story with flat roof and built entirely of brick, concrete and hollow tile—is said to be so large that it will have its own indoor highway system and "work villages" for thousands of new employes. A new "war-speed" method for pouring concrete has been developed to accelerate construction work. It involves the use of large mobile forms which can be trundled to new locations immediately after dismantling from pillars and other structural sections which have set.

National Aircraft Standards Committee is engaged in the development of a list of standard sizes of steel tubing, in co-operation with the Army, Navy and WPB. Estimates indicate annual consumption of 60,000,000 lineal feet of steel tubing in various sizes and shapes for combat aircraft. Principal uses are in engine and gun mounts, landing gears, fuselage structures, hydraulic cylinders and the like. Large quantities of tubing and pipe also are necessary for construction of assembly jigs in manufacturers' plants.

Bullard Workers Give Fighter Plane to Army Air Forces

EMPLOYES of The Bullard Co., Bridgeport, Conn., presented a Republic P-47 fighting plane to the United States Army Air Forces Oct. 18, at the Army Air Base in Stratford, Conn. Inspiration for the drive to raise funds to buy the plane originated in the presentation of the Army-Navy "E" recently when a dozen Army planes roared over the Bullard plant in salute during the ceremonies. One of the workers shouted to his fellow employes: "Boys, let's buy one of those for the Army".

A committee of employes was organized and every employe pledged to contribute a share toward the fund.

The plane was christened the Bullard Thunderbolt by Mrs. Esther Norell, a crane operator with many years service with the company, and Mrs. Elsie McKee, a company nurse. They were attended by Mrs. Norell's twin sons, aged 12. As one of the Norell boys handed his mother a flask of oxygen to be used in the christening, he amused spectators by advising her quite audibly to "Whack it good, Mom."

Later, 5000 Bullard employes plus members of their families attended a celebration of the presentation at the machine tool plant. The ceremony was broadcast from coast to coast.

The Bullard War Service Club has decided to "adopt" the pilot to whom the P-47 will be permanently assigned. The War Department has made arrangements to send wires to Bullard employes at intervals informing them of the plane's achievements.

Shown above is a general view of the celebration ceremony. At left: Raymond Norell, Co-sponsors Mrs. McKee and Mrs. Norell and Richard Norell.

Suppliers Study Shortages of Materials, Limitation Orders

SHORTAGES of materials, limitation orders and priorities hang over hardware manufacturers and distributors like a heavy cloud and all signs indicate that the problems will become more aggravated as the war progresses.

In an effort to get expert guidance in meeting the requirements of the war effort and in keeping their establishments in operation, more than 1600 members of the American Hardware Manufacturers Association, National Wholesale Hardware Association and National Association of Sheet Metal Distributors met in the Palmer House, Chicago, Oct. 19, in their semiannual triple convention.

Principal speakers were representatives from government agencies and departments and they were unanimous in their warnings that the supplies of critical materials would become more acute and that the industry must be prepared to meet whatever restrictions might have to be placed upon it. The convention was a far cry from those normally held in which the problem of improved merchandising is the foremost topic.

Discussing "Limitation Order L-63" at the opening joint session, Linford C. White, chief, distributors' branch, WPB, Washington, stated that this order, which governs suppliers' inventories was drawn to protect supply agencies, and the latter must live within it for their own good as well as the good of the war program. There is not enough material to go around, he said, and what is available must be used for the most important needs first.

To Utilize Idle Material

At a second session, attended by the Wholesale Hardware association and Sheet Metal Distributors, Russell C. Duncan, materials redistribution branch, WPB, Washington, asserted that considerable quantities of materials are available throughout the country, but are idle for numerous reasons. Among these are that production has been stopped or curtailed, or designs have been changed. The problem for his branch, therefore, is to obtain accurate inventory data, and to make it available to other WPB branches so that the materials can be acquired for urgent needs.

"The Distribution of Small Tools," was a subject which Roy Halquist, chief, hardware and small tools section, building materials branch, WPB, Washington, sought to explain. Work of this division has only recently been organized. In recognition of the importance of small tools to the war program, Mr. Halquist stated the critical shortage of materials had been eased somewhat by development of a simplification program in the number and types of tools. The same thing is now being undertaken for building hardware. But in spite of all this, the supply of metals will fall short of meeting requirements. After explaining how the PRP plan works in the case of small tools, the speaker urged that distributors sell only to essential war plants and limit their stocks to the minimum.

Ray C. Neal, WPB, Washington, outlined the work of the distributors' branch, and made it clear that the division is merely a liaison group between distributors and other government departments, and has no ratings of its own.

Dean C. Gallagher, chief, emergency rating branch, WPB, Washington, explained how his office functions in arranging repair, maintenance and operating supplies. In spite of all efforts to simplify procedure, thousands of requests must be handled monthly.

Most ordinary civilian production is out for the duration and those individuals and firms who deal in such products will have to adjust themselves to current conditions, Clifford F. Hood, president, American Steel & Wire Co., Cleveland, stated in an evening address to the three associations in joint session.

Speaking on "The Steel Industry and the War Effort," Mr. Hood asserted: "Even with the release of some items in the future for civilian use, I cannot see for the duration of the war any possibility that you can be supplied on anything but a quota basis or some form of regulation handled by the government. Under these conditions, I certainly don't believe you can anticipate that the availability of certain items will approach the requirements of your normal trade.—The facts must be faced and proper adjustments made."

Manufacturers and distributors must adjust themselves to changing conditions and take inventory of their methods and procedures if they are to continue in business, Mr. Hood said. Pointing out that of the consumer dollar, on the average, 59 cents has been going for the services of distribution and 41 cents for the processes of production, he admonished his listeners not to take out of the dollar more than they put into it in the way of benefits or services.

"If your share of the dollar in your particular field is, let us say, ten cents, make sure that you contribute ten cents or more of service or benefit to the 100 cents worth of the whole. If you do that you need have no fear; but for those who extract their dime and add only a nickel, I warn of the days to come," Mr. Hood stated.

Pointing out that markets have a way of changing without our realizing it, Mr. Hood further declared: "Some firms which have been dealing in consumers goods may suddenly discover that through a process of gradual change, elimination of old products and substitution of new ones, they have accomplished an unconscious transition to a durable goods business. We must see if we are doing, each of us, our several jobs as efficiently and as economically as possible."

MEETINGS . . . .

Electric Metal Makers Guild, Inc.—A round-table discussion of the scrap metal situation and hot metal preparation will be led by H. W. McQuaid of the War Production Board at Hotel Roosevelt, Pittsburgh, Saturday afternoon, Oct. 31. At a special dinner in the evening General H. C. Minton, formerly in charge of Watertown Arsenal and chief of Pittsburgh Ordnance district, will be the principal speaker. H. F. Walther, assistant open-hearth superintendent, Timken Steel & Tube Co., Canton, O., and guild president, will preside.

Institute of Scrap Iron and Steel Inc.—The fifteenth annual convention and war conference will be held at Hotel Pennsylvania, New York, Jan. 16-17. It is expected that one of the two days will be devoted entirely to government speakers to consider problems of the scrap industry.

American Petroleum Institute—Petroleum Co-ordinator H. L. Ickes, Deputy Co-ordinator R. K. Davies, and Defense Transportation Director J. B. Eastman will be among the speakers at the twenty-third annual meeting to be held at the Palmer House, Chicago, Nov. 9-12. Nine group sessions have been scheduled.

American Mining Congress—A metal mine conference between mine operators and key officials of the war agencies charged with the responsibility of metal and mineral production, will be held at Salt Lake City, Utah, Nov. 16-17.

American Gear Manufacturers Association—Headquarters of the association have been moved from 602 Shields building, Wilkinsburg, Pa. to 301-2 Empire building, Pittsburgh.

Aircraft "Final Key to Victory," Declares Machine Tool Builder

PRESSING problems having to do with materials, design, production and personnel as related to and as affected by the war effort, drew unusually large attendance to the semiannual meeting of American Gear Manufacturers Association. The meeting at Skytop Lodge, Skytop, Pa., Oct. 15-17, featured two guest speakers from outside the gear industry, both of whom dealt with the war situation as viewed by men concerned with mass production.

One of these speakers, Howard W. Dunbar, vice president and general manager, Grinding Machine Division, Norton Co., Worcester, Mass., had an interesting dual viewpoint on the situation. He is back in industry after nearly two years in Washington, where until recently he was assistant chief of the tools branch of the War Production Board.

While, according to Mr. Dunbar, there may be in this country actually more machines than are needed to carry out the entire war program as it eventually will shape up, the constantly changing fortunes of war of the United Nations have brought about and are bringing about sudden shifts in emphasis which make it impossible to have all the tools needed in the right place at the right time.

It is his belief that air power will prove to be the final key to victory for the United Nations and that more and more emphasis will be put on the production of aircraft. The chief function of the great armies now being raised and equipped will—he is convinced—be to take over and administer conquered territories.

War Effort Showing Results

While this speaker is strongly of the opinion that public opinion is mainly responsible for slowness of awakening and slowness in getting under way of this country's war effort and that every effort still is in order to arouse public opinion to a point far above the average now prevailing, he has found in recent "swings around the industrial circuit" that the war production effort generally is coming along better than some pessimists would have us believe. He cited the conversion of the automobile industry and the splendid job being done by American railroads as prime examples of things which instil hope.

In the face of a critical attitude in certain government circles, this war program has proved beyond question that "industry can take it," both in the form of unselfish work of business men in Washington and in the tooling up of factories and delivery of goods.

The other guest speaker was Chester H. Lang, vice president, General Electric Co., Schenectady, N. Y., who delivered the dinner address. Like Mr. Dunbar, he urged more complete public awakening to the real facts as to the war situation and an end to self-satisfaction in America. Mentioning in particular Army-Navy "E" awards, he emphasized the need to change the slogan from "Well done!" to "Well begun!" This award thereby would mark the good start of a tough production contest and would not be mistaken as a signal of its successful conclusion or even assurance of that outcome.

Two Papers Outstanding

Of the papers delivered during the convention, two were rather outstanding in character. One was entitled "Substitution of Materials as a Necessary Aid to the War Effort." This was by E. J. Wellauer, supervisor of research and metallurgy, Falk Corp., Milwaukee. In this paper Mr. Wellauer held forth little hope to those who expected preferential treatment on alloys and who did not have the most critical need for them.

He dealt with the engineering analysis of expected performance of machine details—gears in particular—and urged that the material selected be no better than the reasonable minimum demanded by service requirements.

In others words, if carbon steel, properly heat treated, will serve the purpose, it certainly should be chosen now in preference to regular alloys or NE steels which soon will be unattainable for such marginal uses.

He also suggested that in inspection work, minor flaws in materials should be carefully scrutinized before scrapping parts, to make sure that their significance was not "optical" rather than "physical." In many cases such minor defects have little or no practical effect on strength and the part should be passed. This paper dealt to considerable length with wartime heat treating as well as wartime materials selection, and is of great value to industry at this time.

The other highly significant paper was that by P. W. Brown, assistant works manager, and Earle Farrar, staff engineer, Wright Aeronautical Corp. Its title was "Design and Manufacture of Aircraft Engine Gearing." To the casual listener, the principal significance of this paper was that by explaining in detail the design requirements of aircraft gearing, it cleared up many misunderstandings as to the "whys-and-wherefore" of this kind of gearing—its specifications and its manufacture.

Many things must be taken into account in aircraft engines where lightness, strength and dependability are the prime requisites. The supporting structures are light, speed is high and the amount of power delivered is tremendous in relation to the size of the mechanism. Careful study of this paper will be enlightening to many subcontractors who may have assumed that the tight limits on metallurgical specifications, fit and finish of aircraft gears are mere whims of a young industry. There are sound reasons for all these, and aircraft gears simply cannot be judged by automotive or other "old-time" standards.

As is usual at AGMA meetings, President John H. Flagg and numerous committee chairmen reported on technical and business studies within the industry since the last meeting. A number of the business reports dealt with such wartime subjects as: Limitation and Conservation; OPA Orders; Production Requirements Plan; Draft and Personnel; Renegotiation; and Statistics.

Closed on Inspired Note

Technical subjects included: Spur and Planetary Gears; Fine Pit Gearing; Gear Sound; Nomenclature and Geometry; Tooth Form; and Research.

Several important recommended practice projects were reported as in their final stages, but none was quite ready for public announcement.

The sum and substance of the inspiration from the meeting can be expressed briefly as follows: (1) Let every member strive to awaken as many Americans as possible to the hard work ahead for all on the long road to victory; (2) Let every bit of material be selected to do the job called for in service.

September Gear Sales 8 Per Cent Under August

American Gear Manufacturers' Association, Wilkinsburg, Pa., reports industrial gear sales for September were 44 per cent above September, 1941, and 8 per cent below August, 1942. Sales in nine months ending with September were 34.2 per cent above the corresponding period in 1941. This compilation applies only to industrial gears and does not include automotive gears or those used in high-speed turbine drives.

Drive Triples Original Goal

Industry-organized campaign in Ohio exceeds expectations of sponsors. Raises $11 dollars for every resident of county

MOUNT VERNON, O.

STANLEY E. JOHNSON, assistant sales manager of Cooper-Bessemer Corp., manufacturers of diesel and gas engines and compressors, is the happiest man in this town.

Recently, in co-operation with local officials and civic leaders, he directed a one-day War Bond Drive here, hoping to collect $100,000 from the 30,000 residents of the city and the rest of Knox county. That would have been more than $3 for every man, woman, and child in the entire area.

Johnson made it a red letter day in Mount Vernon history. Everyone dropped anything else he might be doing to watch or take part in one of the most spectacular drives ever conducted in the state.

As a result, the $100,000 goal was not only realized within a few hours, but for the day, Johnson counted a total of $350,855 — and the figure was still going up — representing more than $11 for every resident in the county.

The salesman did not overlook a single possibility in organizing the Knox County Victory Bond Day. Interesting events took place in steady succession. The whole city hung out bunting, flags and other decorations. Crowds gathered early in the morning at Victory Square.

The events started at 10 a. m. when at the sound of air raid sirens everyone in the city was asked to rise and stand quietly with bowed heads for two minutes. At that moment the Rev. Alex Hawks, rector of St. Paul's Episcopal Church pronounced an invocation, in the square. There was not an idle moment from then on until nearly midnight.

There was speechmaking, musical entertainment, a beauty contest, demonstration of United States Army jeeps, dropping of "bombs" from planes, auctioning of cattle, "sock-a-dictator" ball throwing contest, street dancing, and refreshments.

The ball was started rolling in the bond drive some weeks earlier by Cooper-Bessemer, Mount Vernon's largest industry which also has a plant in Grove City, Pa. On Aug. 29, the firm received the United States Treasury's Minute Man Flag for subscribing 10 per cent of its payroll for War Bonds. Every official and employe in the Mount Vernon plant subscribed.

Johnson has been with Cooper-Bessemer for 23 years, and has been active in Mount Vernon civic affairs. He is a director of the Y.M.C.A., and a member of the Chamber of Commerce; has taken leadership in other fund drives, such as the last Community Fund Drive, an outstanding success.

ASSEMBLY SUGGESTION WINS HER $300 IN BONDS

WHEN this girl went to work in the machine gun plant of General Motors' Saginaw Steering Gear Division the job of assembling leaf and slide of rear gun sights was a tedious matching operation. It had been taking a man almost two minutes per sight to complete. Just one month later she showed the foreman how, by gaging each part in advance, production could be increased to two a minute. Her suggestion was one of 31,777 submitted in the first five months' operation of GM's suggestion plan to increase war production. She received an award of three $100 war bonds and $4.50 in war stamps

Oil Company Organizes Plant "Army" To Sell War Bonds

How Standard Oil Co. of California went over the top with a war bond drive is described in the company's September bulletin to shareholders. The company set up its payroll deduction plan for the purchase of bonds shortly after Pearl Harbor. One-fourth of the employes had responded when it decided to set a new pace. The new campaign began May 30 when the company's president called for 10 per cent payroll savings by all employes.

Employes were divided into seven divisions, each headed by a "general" chosen from the rank-and-file. The divisions in turn were divided into battalions and squads, and each squad leader was made a solicitor. War savings bulletins were issued regularly to report the drive's progress.

As an extra incentive the company donated $15,000 to be distributed in war savings stamps among the squads with 100 per cent sign-up of employes, each saving 10 per cent or more per month.

At the end of the campaign 99.6 per cent of the employes solicited had pledged 10.7 per cent of their salaries—a monthly group investment of $349,500.

September War Bond Sales Aggregate $838,000,000

War Bond sales in September amounted to $838,000,000, $63,000,000 more than the national quota for the month. This was the second time that the quota has been exceeded since last May.

Because of heavy income tax payments due in September, a temporary decline in sales was expected, but volume exceeded that for August by $141,000,000.

Perform Various Jobs To Release Men for Service

Figures from companies representing 68 per cent of the automotive industry show that employment of women rose 50 per cent from May to August this year, total for the latter month being 59,700. At Packard women now work in drafting rooms (below), parts inspection departments, machine tool divisions. They comprise 10 per cent of Packard employment

This woman, 40, and a mother, is employed by General Electric Co. as a truck driver, hauling loaded trailers from dispatching centers within the plant

Below—This girl used to make grids for radio tubes, but now she operates a power hacksaw in Federal Shipbuilding & Dry Dock Co.'s Port Newark, N. J. yards

After a four-week training course, women operate cranes in Carnegie-Illinois Steel Corp.'s Gary, Ind., mills

MEN of INDUSTRY

K. R. VAN TASSEL has been appointed manager of sales of the newly formed integral-horsepower motor section of General Electric Co.'s Motor Division. A graduate of Massachusetts Institute of Technology in 1925, he joined General Electric as a student engineer the same year. After serving in various departments, Mr. Van Tassel was made manager of sales of Lynn motors at the company's Lynn, Mass., works, which position he has held since 1940.

D. A. Yates, associated with General Electric since 1930, has been placed in charge of the Lynn motor group at G-E's Lynn, Mass., plant.

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N. M. Forsythe has been named general sales manager, Pump Engineering Service Corp., Cleveland, a division of Borg-Warner Corp.

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A. W. Herrington, chairman of the board, Marmon-Herrington Co. Inc., Indianapolis, has been elected a director, Aviation Corp., replacing **T. M. Girdler** on the directorate.

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Burrell T. Dye has been appointed superintendent of industrial relations of Republic Steel Corp.'s Buffalo plant. He succeeds **Martin H. Stearns,** resigned.

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Harry Newcomb has been elected a vice president, Servel Inc., Evansville, Ind. He continues as general manager of Servel's electrical refrigeration and air conditioning division.

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Franklin D. Colburn has been elected comptroller and director, American Bridge Co., Pittsburgh, a United States Steel Corp. subsidiary. Continuously associated with the construction field since 1922, Mr. Colburn has held the following positions: Assistant treasurer, Fraser, Brace & Co.; general auditor, Hegeman-Harris Co. Inc.; and treasurer and director, John W. Harris Associates Inc., New York.

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George E. Root, the past 30 years general agent and purchasing agent, Chicago, Duluth & Georgian Bay Transit Co., Chicago, retired Oct. 15.

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H. P. Binder has been appointed manager of the centrifugal pump department, Allis-Chalmers Mfg. Co., Milwaukee. He formerly was assistant manager of the hydraulic department, in charge of centrifugal pump sales and engineering.

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S. G. Sargis, supervisor of industrial relations at the Torrance, Calif., plant of Columbia Steel Co., has been promoted to assistant manager of industrial relations for the company. He has been succeeded at Torrance by **J. H. Clark Jr.,** heretofore assistant supervisor of industrial relations at the Pittsburg, Calif., plant.

K. R. Van Tassel

D. A. Yates

F. D. Colburn

—o—

George E. Anderson, associated with National Forge & Ordnance Co., Irvine, Pa., 13 years, the past six in the sales department handling estimating and advertising, has been promoted to field engineer. He will cover western Pennsylvania, western Maryland, West Virginia and western Virginia territories.

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Paul T. Koenig, an accountant with Ohio Crankshaft Inc., Cleveland, war subsidiary of Ohio Crankshaft Co., has been made auditor of the parent concern.

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Charles W. Lerch, president, Charles Lerch Elevator Co. Inc., Chicago, was awarded the Octave Chanute medal of the Western Society of Engineers "for notable contributions to the engineering profession" at the fall dinner meeting of the society in Chicago, Oct. 12.

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E. T. Knobloch, heretofore vice president and general manager, Union Iron Works, Erie, Pa., has been elected president and general manager, succeeding **E. H. Brevillier. R. E. Sevin** has been elected vice president and sales manager. **E. E. Knobloch** and **O. E. Henning** continue as treasurer and secretary, respectively.

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C. A. Reimschissel, Landis Machine Co., Waynesboro, Pa., has been appointed a member of the sectional committee on pipe thread of the American Standards Association.

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Elmer Bimberg has been appointed plant manager, Zenith Carburetor Division, Bendix Aviation Corp., Detroit. He succeeds **J. T. Black,** resigned. Chief engineer for five years prior to his new appointment, and assistant chief engineer for ten years, Mr. Bimberg takes over his new position with some 26 years of Zenith experience.

Harold W. Snow, formerly assistant personnel director, Bundy Tubing Co., Detroit, has been named personnel manager for Zenith.

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Donald W. Fairbairn has been named district manager of the newly created sales district for the National Sales and Service Division of B. F. Goodrich Co., Akron, O., for the Pacific Coast area, with the exception of Seattle. Headquarters are in Los Angeles.

William R. Edwards, formerly salesman in the Industrial Products Division, takes over Mr. Fairbairn's duties on rubber tracks for military vehicles. **W. B. Collier** has been named sales engineer on fuel cells. **H. V. Dwight,** formerly technical representative in the Washington office, is sales engineer on rubber tracks.

H. V. Kidwell has been assigned to

the Detroit district, working with the ordnance department; **R. A. Maxwell** has been named staff man on all tire problems other than aeronautical; and **L. I. Gibbons** has been transferred to the field engineering department, with headquarters in Detroit.

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Edward L. Robinson has been appointed assistant to the manager, Metallurgical Division, Pittsburgh district, Carnegie-Illinois Steel Corp. Mr. Robinson has held the position of assistant chief metallurgist, Irvin Works, the past two years.

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C. F. Lingenfelter, superintendent of the Toledo division, Pennsylvania railroad, has been appointed assistant general manager, western division, headquarters in Chicago. He has been associated with the road nearly 45 years.

Officers Elected by Scrap Institute's Chapters

Officers of the various chapters of the Institute of Scrap Iron and Steel Inc. elected for the coming year are:

Philadelphia:

President, Harry A. Kirchmann, Allegheny Iron & Metal Co.; vice president, Samuel J. Abrams, Abrams Metal Co.; secretary, Marcus J. Margulies, A. M. Wood & Co. Inc.; treasurer, Harry Stave, Stave Bros.

Pittsburgh:

President, David L. Wilkoff, D. L. Wilkoff Co.; vice president, Amos Bowman, Luria Bros. & Co.; secretary, Charles C. Burstein, M. N. Landay Co.; treasurer, William L. Behm, United Iron & Metal Co.; chairman of executive committee, Hugh Ruffner Jr., J. Stephens Co.

Northern California:

President, Marshall A. Shapiro, California Scrap Iron Corp., Oakland, Calif.; vice president, Vernon Barker, Steel Mill Supply Co., Sacramento, Calif.; secretary-treasurer, Stanley Davidson, care of M. Davidson, Stockton, Calif.

Michigan:

President, Samuel G. Keywell, Samuel G. Keywell Co. Inc., Detroit; first vice president, Jay Lenick, E. Lenick & Co., Saginaw, Mich.; second vice president, Jerome J. Fisher, Fisher Iron & Metal Co., Muskegon, Mich.; secretary, Hyman R. Nathan, Gendelman & Nathan Iron & Metal Co., Detroit; treasurer, Harry Jones, Jones Iron & Metal Co., Dearborn, Mich.

St. Louis:

President, Jack R. Forcheimer, Jack R. Forcheimer & Son; first vice president, Abe P. Ashner, Lefton Industrial Corp.; second vice president, Abe Grossman, Grossman Iron & Metal Co. Inc.; third vice president, Hyman Cohen, Standard Steel & Rail Co.; secretary-treasurer, Charles F. Harding, Hickman, Williams & Co. Inc.; chairman of executive committee, Gus Gillerman, Gus Gillerman Iron & Metal Co.

Capitol District:

President, Milton Symansky, Symansky Bros., Troy, N. Y.; vice president, Louis Contey, Trojan Scrap Iron Corp., Troy; secretary, Benjamin Apple, Symansky Bros.; treasurer, Joseph C. Klein, Albany, N. Y.; chairman of executive committee, Charles Buff, Buff Companies Inc., Schenectady, N. Y.

Boston:

President, David S. Borowsky, care of Jacob Borowsky, Fitchburg, Mass.; first vice president, Joseph Cohen, General Scrap Iron Inc., Phillipsdale, R. I.; second vice president, Frank B. Gordon, Harcon Corp., Boston; treasurer, Ernst Hollander, Ernst Hollander Iron & Metal Corp., Chelsea, Mass.; secretary, George H. Berger, A. Berger & Sons Inc., Brockton, Mass.; chairman of executive committee, William G. Mitchell, William G. Mitchell Co., Marblehead, Mass.

Southern New England:

President, Simon J. Katz, Atlantic Steel & Iron Co., Springfield, Mass.; first vice president, S. Samuel Kasden, H. Kasden & Sons Inc., New Haven, Conn.; second vice president, Joseph A. Schiavone, Michael Schiavone & Sons Inc., New Haven; secretary-treasurer, Max Grossman, J. Grossman & Sons Inc., Meriden, Conn.

Cincinnati:

President, George L. Sturm, Middletown Iron & Steel Co., Middletown, O.; vice president, Abe Byer, American Compressed Steel Corp., Cincinnati; secretary-treasurer, Sam Moskowitz Bros., Cincinnati.

Chicago:

President, William Pohn, Pohn Iron & Metal Co., Chicago; first vice president, Frank Grossman, Grossman Bros. Co., Milwaukee; second vice president, Arthur M. Price, Price-Watson Co., Chicago; third vice president, John T. McEnroe, John T. McEnroe Co., Chicago; secretary, Harvey Kaplan, M. S. Kaplan Co., Chicago; treasurer, Henry Rosenthal, Briggs & Turivas, Blue Island, Ill.; chairman of executive committee, Frank Cohen, D. R. & F. A. Cohen Co., Chicago.

Southeastern:

Newly organized: President, Garrison Siskin, R. H. Siskin & Sons, Chattanooga, Tenn.; first vice president, J. B. Knight, J. T. Knight & Son Inc., Columbus, Ga.; second vice president, Max L. Kimerling, M. Kimerling & Sons, Birmingham, Ala.; third vice president, M. W. Breman, Breman Iron & Metal Co., Atlanta, Ga.; secretary-treasurer, Herbert B. Luria III, Luria Bros. & Co. Inc., Jacksonville, Fla.

Southern:

Reorganized: President, W. Alex Rawls, Alex Rawls Wrecking Co., Rocky Mount, N. C.; first vice president, Sol Katz, Katz Bros. & Co. Inc., Columbia, S. C.; second vice president, Sam Golden, Virginia Scrap Iron & Metal Co. Inc., Roanoke, Va.; secretary-treasurer, Sol J. Levin, Levin Bros., Burlington, N. C.

Western New York:

President, Jay J. Risman, Morrison & Risman Co. Inc., Buffalo; vice president, Nathan H. Jacobs, Buffalo House Wrecking & Salvage Co., Buffalo; secretary-treasurer, Leo Chapin, Chapin & Fagin Inc., Buffalo.

OBITUARIES . . .

Reginald F. Jopling, 75, former vice president, American Steel & Wire Co., Cleveland, died in that city, Oct. 20. Mr. Jopling was the son of Thomas Jopling, one of the organizers of Otis Steel Co. A graduate of Columbia School of Mining, Mr. Jopling had been head chemist for Otis, before becoming associated with American Steel & Wire.

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Stanley W. Harris, president, McNeil Machine & Engineering Co., Akron, O., died Oct. 11, in that city.

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Norris F. McNaught, vice president and treasurer, Duro Metal Products Co., Chicago, died in that city, Oct. 15.

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Ernest W. Teagle, 67, vice president, Sun Oil Co. of Ohio, died in Chicago, Oct. 7. He was in charge of the company's activities in the Chicago area.

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Allan F. Millikan, 76, vice president, American Stove Co., Chicago, died in that city, Oct. 12.

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George A. Goss, 61, former vice president and director, Scovill Mfg. Co., Waterbury, Conn., died Oct. 13. He had been retired since 1929.

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Walter H. Schakton, 56, district manager, Allen-Bradley Co., Milwaukee, died Oct. 16, in that city. He was a member, Milwaukee Maintenance Engineers, American Institute of Electrical Engineers and Milwaukee Engineering Society.

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Carl Woodruff Blossom, 61, president, Cleveland Hobbing Machine Co., Cleveland, died Oct. 14. Following graduation from Harvard University, he founded the Grant Lees Machine Co., of which he was secretary-treasurer until he joined Cleveland Hobbing Machine.

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C. E. Anderson, 56, western manager, National Carbon Co., Chicago, died in Evanston, Ill., Oct. 14. He had been associated with the company since 1919.

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Albert W. Wilkins, 60, secretary, Mid-West Shippers Advisory Board, and assistant district manager, Association of American Railroads, Chicago, died Oct. 17, in Evanston, Ill. He was one of the original members of the board.

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W. J. Whiteside, 51, retired manufacturing manager, Nela Park plant, General Electric Co., Cleveland, died Oct. 6 in that city.

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James R. Lennox, vice president and a founder, Lennox Mfg. Co., Chicago, sheet metal products, died in Oak Park, Ill., Oct. 17.

Huge Chicago Magnesium Foundry Nears Completion

One of the world's largest magnesium foundries, Howard Foundry Co., with an anticipated monthly production of over 500,000 pounds of castings, is rapidly nearing completion in Chicago. General offices of the company will soon be moved to the new plant at 4900 Bloomingdale road.

Aurora Foundry Co., Aurora, Ill., recently acquired by the firm, will handle production of all Howard brass, bronze and copper castings and will be known as the Bronze Division. The original Howard Foundry at 1700 North Kostner avenue, Chicago, awarded the Army-Navy "E" not long ago, will be known as the Aluminum Division, and will cast that metal solely. All Howard foundries are engaged 100 per cent on war orders.

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American Rolling Mill Co., Middletown, O., announces that manufacture and sale of Armco pipe and drainage products in Illinois and lower Michigan will be handled by Armco Drainage & Metal Products Inc. This company succeeds the W. Q. O'Neall Co. of Illinois, Springfield, Ill., and the U. S. Bridge & Culvert Co., Bay City, Mich. Offices and main plant of the Illinois-Michigan division are at 6559 South Lorel avenue, Chicago. Roy E. Smith, formerly manager of the O'Neall company, is manager of the new division.

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Link-Belt Co., Chicago, has coined the term "Productioneer" for its war workers, both men and women. At the Dodge and Ewart plants at Indianapolis a four-page paper is published once a month, *Link-Belt Productioneer*, and mailed to the homes of all employes. Use of the new term is offered to any industrial organization desiring to adopt it.

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A new company has been formed by former operating officials of the defunct Great Western Mfg. Co., Leavenworth, Kans., following their purchase in August at public auction of a large part of the plant and equipment of the 84-year-old foundry machine manufacturer. Successor company, to be known as Great Western Mfg. Co., (unincorporated), is owned jointly by Ernest Schroeder, former milling engineer, and J. E. Baker, former secretary of the original firm. Contracts for supplying a large number of former customers have been placed with the new concern.

—o—

Merchandising Division of Westinghouse Electric & Mfg. Co. has been renamed Electric Appliance Division, it is announced by J. H. Ashbaugh, manager. The new name better indicates the manufacturing facilities at both the Mansfield, O., and Springfield, Mass., plants, which are now producing only for war.

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Industrial Steel & Wire Co. has moved its office to new quarters at 1434-1436 West Lake street, Chicago.

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Newcomb-David Co. Inc., Detroit, is now known as the Newcomb-Detroit Co. Established in 1912, the company manufacturers spray booths, dust collectors, exhaust and ventilating systems, drying ovens and other sheet metal equipment used for industrial purposes. Cyrus B. Newcomb is president; Clarence A. Dauer, vice president; Ian B. MacLellan, secretary-treasurer; Avon L. Newcomb, assistant secretary, and William T. Quick, assistant treasurer. The company will continue to operate in its present plant at 5741 Russell street.

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Rockford Iron Works Inc. has moved its office and plant from Rockford, Ill., to 6411 West Burnham avenue, Milwaukee.

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Heil & Co., Cleveland, manufacturer of chemical resisting equipment, has changed its name to Heil Engineering Co.

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Aircraft Parts Development Corp., Summit, N. J., has been organized to handle research and development work on parts and materials for the aircraft industry, particularly in the fields of fastening devices, powdered metals and plastics. It is planned to solicit ideas and untested projects from engineers and inventors, and to carry them through complete development to the point of release for commercial manufacture.

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Blanchard Machine Co., Cambridge, Mass., has appointed Rudel Machinery Co. Inc., New York and Hartford, Conn., its representative in eastern New York, northern New Jersey and Connecticut.

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Eicor Inc., Chicago, manufacturer of electrical machinery, soon will move into a building which company has purchased, discontinuing operations at its present address, 1060 West Adams street.

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George L. Sexton, recently sold all the capital stock of his company, Automatic Machinery Mfg. Corp., Bridgeport, Conn., to National Fireworks Inc., West Hanover, Mass., and has resigned as president and general manager. He now is located in the Defense building, 1026 Seventeenth street, Northwest, Washington, where he will operate a business consulting service.

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International Hoist & Machine Co. has acquired part of the plant of the former Hay Foundry & Iron Works, Newark, N. J., including two buildings from Bethlehem Steel Co., for expanding war production. The Hay interests were included in the merger of several leading structural steel fabricating shops by Bethlehem Steel Co. some years ago.

TRAINING INSTRUMENT EXPERTS FOR AIR SERVICE

INSTRUMENT service training school is being conducted by General Electric Co., Schenectady, N. Y., at its West Lynn works at request of Air Service Command. Pictured are some of the 49 students who have completed a three-week preliminary training course

Plan To Place 50,000 Men, Women In War Plants, Army Each Month

TORONTO, ONT.

PLANS are under way for establishment of an organization to place 50,000 men and women each month in Canada's war industry and the army, to be supervised by National Selective Service and Wartime Prices and Trade Board. Curtailment of less essential industry will be undertaken as a means for increasing available war workers.

For the remainder of this year war plants will require at least 30,000 new workers each month to bring the total to 1,000,000 by the end of the year. At peak production, expected early next year, war industries are expected to employ 1,100,000 persons. Army requirements under the draft are about 20,000 per month and there has been no indication of a change in that figure. Many of these will be taken from essential industry, which also will have to replace men who enlist voluntarily.

Further curtailment of gold mining and other nonwar industries is to be undertaken under orders of the prime minister, to meet need for men and materials in the war effort. Plans will be worked out in consultation with management and employes. The plan will not affect gold mines producing substantial quantities of minerals and metals for war purposes.

War Contracts Reach Peak

Department of Munitions and Supply reports contracts placed and commitments made on Canadian, United Kingdom and other accounts exceed $5,500,000,000 from July 14, 1939, to Sept. 30, 1942. In addition are many millions represented by letters of intention and unvalued acceptance of orders. Contracts placed on Canadian account, including plants and plant extensions, a portion of which is chargeable to other Empire countries under the air training plan, general purchases and other items totaled $2,882,775,034. Aggregate of orders on United Kingdom account for plants, extensions and for output of some of these plants is $2,240,577,316, an estimated figure including the United Kingdom's share in joint projects. Other contracts totaled $373,159,652.

Approximately 400,000 contracts have been placed on Canadian account by the Department of Munitions and Supply and its predecessor bodies, with average value of more than $7100. In third quarter a peak was reached with a monthly average of 20,043 contracts, compared with 15,082 each month in the corresponding period in 1941.

E. P. Taylor has been reappointed president of War Supplies Ltd., a government owned corporation formed to implement the Hyde Park agreement, with headquarters in Washington. After serving as executive assistant to C. D. Howe, Canadian minister of munitions and supply, in 1941, Mr. Taylor was appointed president of War Supplies Ltd., later giving up this position to serve the British government as vice chairman of the British Supply Council in North America and director general of the British Purchasing Commission.

Harry J. Carmichael, Canadian production co-ordinator, addressing a gathering of 1500 manufacturers and industrial executives at a special conference Oct. 17, warned that shortage of vital metals is so critical that it is necessary that all manufacturers conserve everything possible. Shortage of manpower and machine tools are equally critical, he stated, and all three must be drastically conserved.

Results of efforts to make the most of labor and material resources were revealed in war-secret exhibits, which were under guard and not open to the public. These portrayed the industrial revolution under way under the conservation program, including such developments as substituting plastics for metal in shell fuse caps. These ranged from refinements in processing to radical metallurgical developments just out of the laboratory.

Mr. Carmichael stated he had estimated to the Department of Munitions and Supply that the conservation and substitution program would save the country $100,000,000 and possibly much more in 1943.

New System To Assure Warehouses Steel for Emergency Purposes

WASHINGTON

To make a reasonable, but limited tonnage of steel products continuously available for emergency purposes, a new system governing distribution of steel products to warehouses will be put into effect Nov. 1, Hiland G. Batcheller, chief, Iron and Steel Branch, announces.

Producers who normally supply warehouses are being directed to ship definite tonnages of specific products to warehouses each month on rated orders.

These "ear-marking" instructions are supplemental to the steel production directives which have been issued by the Iron and Steel Branch for the past two months.

Under the present system, warehouse purchase orders are filled in the sequence indicated by preference ratings, which often have been too low to enable warehouses to obtain necessary supplies.

Virtually all of the steel products obtained by warehouses under the system to take effect Nov. 1 will flow directly into the war production program or into other essential uses such as mine, agricultural, railroad, or power plant maintenance.

Under Order M-21-b, as amended, warehouses are permitted to sell most steel products only on A-1-a or higher rated orders, except for small percentages sold under repair and maintenance orders such as P-100. Certain other items such as wire, nails, staples and farm fence may be sold by warehouses for repair purposes without a preference rating.

The overall monthly tonnages needed for distribution by warehouses will be determined by the Iron and Steel Branch. The tonnage required then will be divided among producing mills, according to the pattern of orders they have on hand from warehouses. Varying regional requirements as well as the overall production obligations of each mill also will be considered.

The instructions sent to the mills are called "warehouse load directive," and generally instruct the mill to consider a specific tonnage of a specific steel product as a monthly "warehouse load."

Producers so instructed must accept and fill for shipment each month properly rated purchase orders received from warehouses up to the amount of the warehouse load, notwithstanding any higher-rated orders for such material on a mill's books from other customers.

Warehouses are required to place their orders at least 30 days prior to the beginning of the month in which delivery is requested. If this requirement is not observed, the mill is not obligated to schedule the order as part of its warehouse load for that month.

ARMY-NAVY AWARDS

N. A. Woodworth Co., Ferndale, Mich., organized two years ago to manufacture aircraft engine parts, recently received "E" flag. Fifty per cent of its several thousand employes are women, and this percentage will rise to 80 by midwinter. In photo, President Woodward, left, Lieut. Col. G. E. Strong, and M. B. Gordon, right, general manager of Wright Aeronautical Co., inspect a Nazi-bullet-pounded Wright Cyclone which contains Woodworth parts

Production of armor castings won the burgee for the Union Steel Castings Division of Blaw-Knox Co. Rear Admiral Claude C. Bloch, left, and Brig. Gen. Hugh C. Minton, right, presented the burgee to D. V. Sherlock, vice president of Blaw-Knox

American Machine & Metals Inc. receives the burgee at East Moline, Ill. Principals at the ceremony, left to right: Brig. Gen. Robert L. Denig, Marine Corps; Lieut. Col. A. K. Stiles, Rock Island, Ill., arsenal; Philip G. Mumford, chairman and president of the company; Comm. F. F. Foster, Navy; John C. Vander Pyl, vice president and secretary

Four "E" flags were presented to plants of Chase Brass & Copper Co. at one ceremony. Honored plants were the Waterbury Mfg. Co., Chase Rolling Mills, Chase Metal Works and the Grand Street office. Shown at left at the Waterbury, Conn., ceremonies are, left to right: R. D. Ely, vice president in charge of production; Charles E. Hart, company president; F. S. Chase, former president; Admiral Thomas C. Hart; Lieut. Gen. Hugh C. Drum; and WPB Chairman Donald M. Nelson. NEA photo

Charles R. Hook, president, American Rolling Mill Co., formally accepted the "E" award for excellence in production at Armco's Middletown and Hamilton, O., division on Oct. 5. Similar ceremonies were held on succeeding days at Armco's Butler, Pa., Ashland, Ky., and Zanesville, O., plants. All divisions of the company now display the pennant

Maritime "M" pennant, the Victory Fleet Flag and labor merit badges for employes was won by the Marion Steam Shovel Co., Marion, O. Attending the ceremony were, left to right: J. E. Schmeltzer, Maritime Commission; Lieut. Gov. Paul M. Herbert of Ohio; D. J. Shelton, president of the company; Roy Bailey who represented the employes

Brig. Gen. Hugh C. Minton and A. E. Walker, president, National Supply Co., Ambridge, Pa., display the burgee awarded the plant, at left. National Supply's labor-management committee pledged: "Our production record now is simply a mark by which we will measure new accomplishments"

More Plants Win Production Flags

ADDITIONAL industrial plants selected to receive the joint Army-Navy Award include:

Allegheny Ludlum Steel Corp., Brackenridge, Pa., and Watervliet, N. Y.
American Welding Co., Carbondale, Pa.
Atlas Press Co., Kalamazoo, Mich.
Auto Ordnance Corp., Bridgeport, Conn.
Auto Specialties Mfg. Co., St. Joseph, Mich.
Barbour Stockwell Co., Cambridge, Massachusetts.
Beech Aircraft Corp., Wichita, Kan.
Bendix Aviation Corp., Eclipse-Pioneer Division, Bendix, N. J., and Philadelphia Division, Philadelphia
Boonton Molding Co., Boonton, N. J.
Brunner Mfg. Co., Utica, N. Y.
Bucyrus Erie Co., South Milwaukee Plant, South Milwaukee, Wis.
Clarostat Mfg. Co. Inc., Brooklyn, N. Y.
James Cunningham Son & Co., Rochester, N. Y.
E. I. du Pont de Nemours & Co., Electro chemicals department plant, and Niagara Falls plant, Niagara Falls, N. Y.
General Motors Corp., Allison Division, Indianapolis.
B. F. Goodrich Co., Akron, O.
Gundlach Co., Fairport, N. Y.
Hobart Mfg. Co., Troy, O.
Hood Rubber Co., Division of B. F. Goodrich Co., Watertown, Mass.
A. R. Hyde & Sons Co., Cambridge, Mass.
The Indum Corp. of America, Utica, N. Y.
Industrial Tool & Die Works Inc., St. Paul.
Johnson Steel & Wire Co., Worcester, Mass.
Leece-Neville Co., (2 plants), Cleveland.
Lights Inc., Alhambra, Calif.
Lipe-Rollaway Corp., Syracuse, N. Y.
Mack Mfg. Co., New Brunswick, N. J.
Monitor Piezo Products Co., South Pasadena, Calif.
Parish Pressed Steel Co., Reading, Pa.
Philco Corp., Chicago branch, Chicago.
Rieke Metal Products Corp., Auburn, Ind.

Leaders of Organized Labor Studying Economics at Harvard

UNDER a trade union fellowship plan 15 trade union representatives have begun a nine months course of study at Harvard University, Cambridge, Mass The course is sponsored by the graduate school of business administration, the Littauer school of public administration and the department of economics. The co-operating unions have chosen their own representatives.

The suggestion that the university consider the possibilities of this fellowship plan was first made by representatives of trade unions in 1941. Decision to undertake the experiment was made after months of planning and consultation, union representatives participating actively at every stage and suggesting subjects for instruction. An advisory committee of national union representatives will collaborate with the university in directing the course.

"Both the unions and the university realize the course is an experiment and that experience will be necessary to demonstrate what subjects will be of most use to unions and what methods of teaching will be most effective," according to a spokesman for the university.

"No one can foresee the exact pattern of the postwar readjustment of industry, but it is clear that a successful relationship between labor and management will be essential in dealing effectively with problems arising after the war. Harvard recognizes the major role labor will play in these settlements."

No definite scholastic requirements are set up, such as completion of a high school education. It is recognized that many able men who could make an excellent record in the course have not completed such a curriculum. More important qualifications are general intelligence, capacity for leadership and devotion to the labor movement. Nearly all the men chosen have records of successful experience as shop committeemen, local union officers or national representatives, who have shown ability to serve the labor movement. Besides selecting the students the unions will pay their expenses and half their tuition. The other half will be paid from a fund raised among friends of the university.

Three principal courses of study are planned. One, called "Economic Analysis", entails an appraisal of the economic condition of business enterprise and industries. The students will attack this by making their own analyses of specific corporations or industries, using materials gathered by unions for wage negotiations or arbitrations and by preparing answers to material submitted by employers in negotiations.

A second course will deal with "Trade Union Problems and Policies." Students will analyze actual problems which have confronted national officers of various unions. These analyses will be prepared as "cases" and each will work out his solution as if he were assigned to handle the problem as union representative.

A third course will be called "Human Problems of Administration." It will involve a study of group psychology and problems arising in handling groups of men. A critical examination will be made of job evaluation plans and the principles of time study and rate setting.

A dinner and evening meeting will be held twice a month at which discussion will be led by a national union president or vice president, who will discuss a situation of special importance to his union. It is hoped these meetings will give the class a good idea of the wide diversity of problems which unions must meet. They will afford the students personal contact with many prominent leaders of the labor movement. Government officials who handle problems of labor will be asked to lead discussions.

Labor representatives attending these courses and dinners will not be the only ones to benefit. It is anticipated that the faculty and students in the university will benefit by contact with men who have practical experience and know industrial conditions at first hand. Free interchange of views and ideas is regarded as a step toward better understanding of problems.

Although the trade fellowship program is new it is not essentially different from those developed in other fields. In-service training to men on leave of absence from the public service is offered by the Littauer school. Officers for many years have been sent by the Army to take the full two-year course at the Harvard business school and the Nieman fellowships give a year at Harvard for newspaper men on much the same basis as the labor fellowship.

Unions in the United States now have probably 100,000 administrative officers, from shop committeemen to international presidents. Universities can not ignore the professional educational interests of such a large and important body of men.

TRACTOR TECHNICIANS JOIN U. S. ENGINEERS

CATERPILLAR Tractor Co. has sponsored a "Corps of Engineers Heavy Shop Company" composed chiefly of skilled men from its Peoria, Ill., plant. The Company consists of 199 officers and men, most of whom will become noncommissioned officers or technicians. The volunteers left Peoria in a body after ceremonies in the heart of the city witnessed by thousands of persons. L. B. Neumiller, president of Caterpillar, and representatives of the armed forces paid tribute to the men

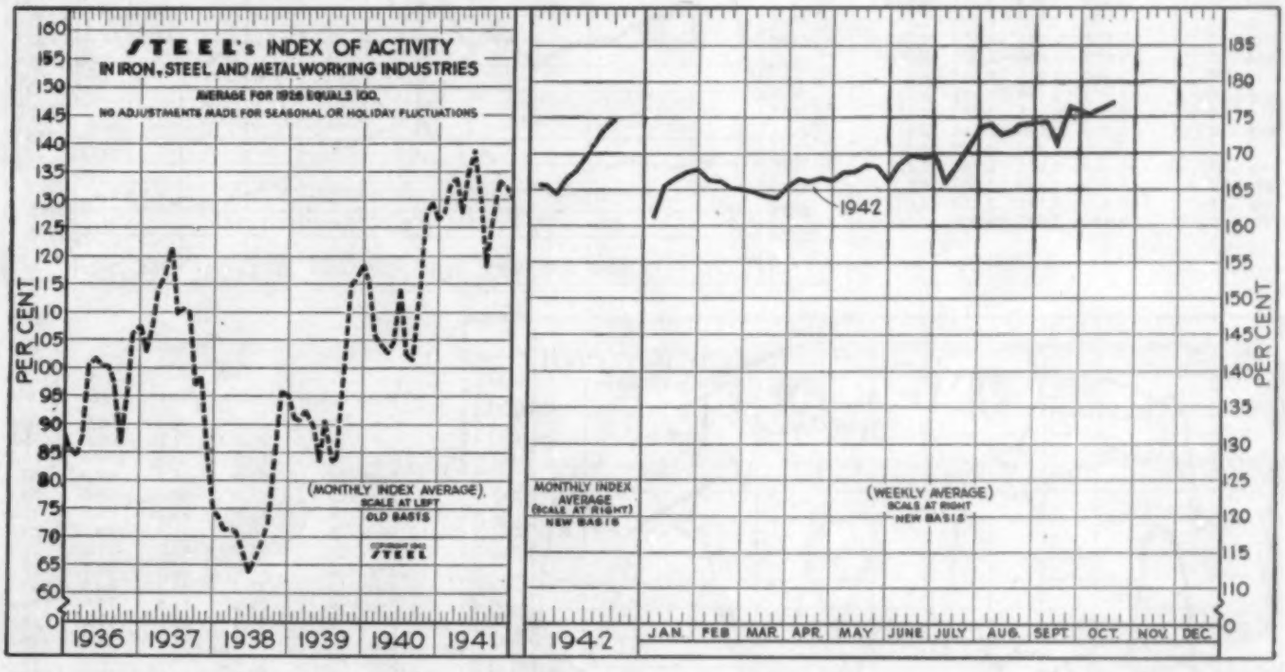
Activity Index Climbs To New Peak Level

INDICATIVE of the steady inroads production of military goods is making into our industrial economy is the recent estimate of the Department of Commerce that in 1943 only 10 per cent of the output of durable goods industries and 60 per cent of non-durable goods will be available for civilian use. The full force of concentrating output in military goods will not be felt until early 1943, for retailers' stockrooms have not yet been depleted. A study made by the Budget Director for a Presidential report to Congress shows that out of every dollar the government spends this fiscal year, 92.4 cents will go into the war effort. Non-war activities will get only 5.2 cents and interest on debt will take 2.4 cents.

STEEL's index of activity climbed to a new peak level of 177.1 during the week ended Oct. 17. This represents a gain of 0.6 point over the preceding week's index figure. Upturn in steelmaking operations and electric power consumption were the chief factors in the latest advance recorded by the index.

The national steel rate again edged upward one-half point during the period ended Oct. 17, to 99 per cent of capacity. A still further gain occurred last week. This represents the third consecutive weekly increase following a period from the first week of July to Oct. 1 during which the national steel rate fluctuated between the narrow limits of 97.5 and 98 per cent. Completion of necessary open hearth furnace repairs and increased steel scrap collections are the chief factors in the recent upturn in steelmaking operations.

Electric power consumption rose to 3,717,360,000 kilowatts during the week ended Oct. 17. Power output is currently 12.2 per cent above that recorded this time a year ago.



STEEL's index of activity gained 0.6 point to 177.1 in the week ending Oct. 17:

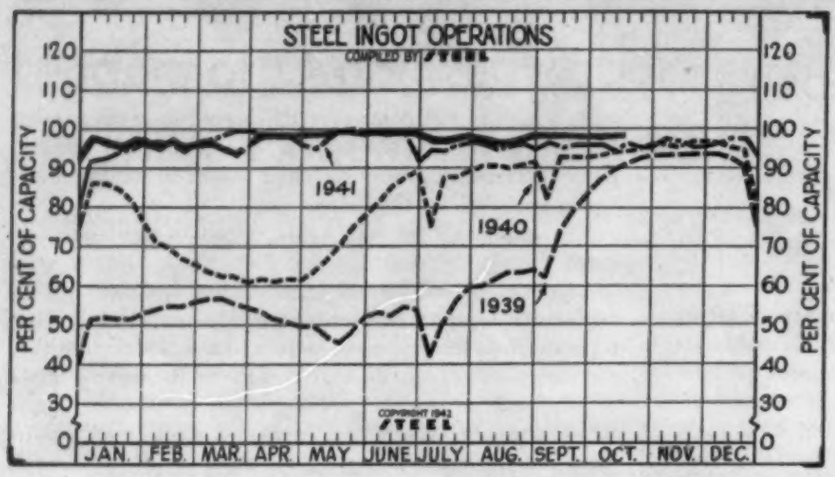
Week Ended	1942	1941
Aug. 15	173.3	118.2
Aug. 22	174.0	118.5
Aug. 29	174.5	118.2
Sept. 5	174.8	111.8
Sept. 12	171.2	131.3
Sept. 19	176.8	130.6
Sept. 26	176.0	132.0
Oct. 3	175.5	132.7
Oct. 10	176.5	132.3
Oct. 17	177.1†	133.4

†Preliminary.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	165.7	127.5	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.6	81.0
May	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	169.4	135.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	174.8	126.4	113.3	98.0	72.3	96.8	89.7	69.7	56.9	68.0	46.5	64.3
Oct.	....	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	....	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	....	130.2	126.3	118.9	93.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

Note: Weekly and monthly indexes for 1942 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production.

THE BUSINESS TREND



Steel Ingot Operations

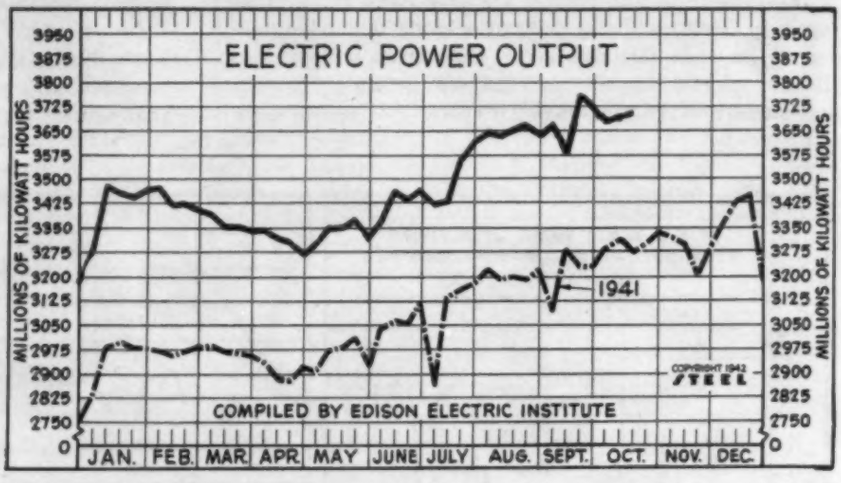
(Per Cent)

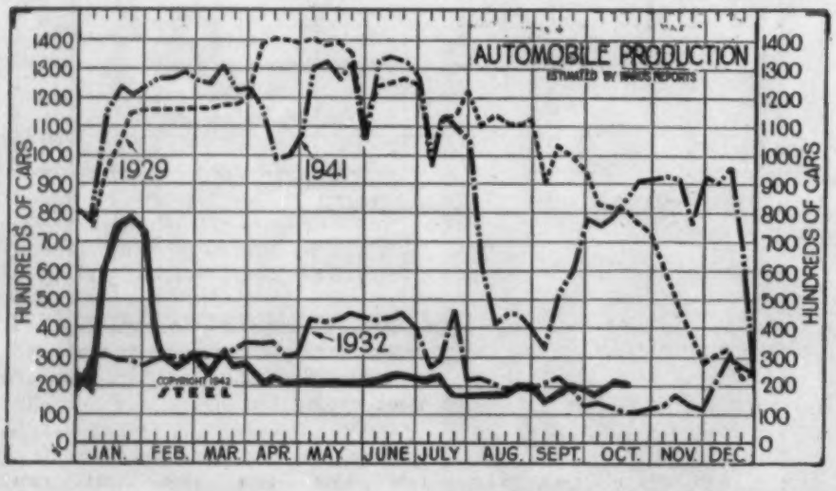
Week ended	1942	1941	1940	1939
Oct. 17	99.0	96.5	95.0	91.0
Oct. 10	98.5	94.5	94.5	89.5
Oct. 3	98.0	96.0	93.5	87.5
Sept. 26	98.0	96.0	93.0	84.0
Sept. 19	98.0	96.0	93.0	79.5
Sept. 12	98.0	96.5	93.0	74.0
Sept. 5	98.0	95.5	82.0	62.0
Aug. 29	98.0	96.5	91.5	61.0
Aug. 22	97.5	96.0	90.5	63.5
Aug. 15	97.0	95.5	90.0	63.5
Aug. 8	97.5	96.5	90.5	62.0
Aug. 1	98.0	97.5	90.5	60.0
July 25	98.5	96.0	89.5	60.0
July 18	98.0	95.0	88.0	56.5
July 11	97.5	95.0	88.0	50.5
July 4	97.5	92.0	75.0	42.0
June 27	98.5	99.5	89.0	54.0

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
Oct. 17	3,717	3,275	2,838	2,576
Oct. 10	3,702	3,315	2,817	2,583
Oct. 3	3,683	3,290	2,792	2,554
Sept. 26	3,720	3,233	2,816	2,559
Sept. 19	3,757	3,232	2,769	2,538
Sept. 12	3,571	3,281	2,773	2,532
Sept. 5	3,673	3,096	2,592	2,376
Aug. 29	3,640	3,224	2,736	2,442
Aug. 22	3,674	3,193	2,714	2,434
Aug. 15	3,655	3,201	2,746	2,454
Aug. 8	3,649	3,196	2,745	2,414
Aug. 1	3,649	3,226	2,762	2,400
July 25	3,626	3,184	2,761	2,427
July 18	3,565	3,163	2,681	2,378
July 11	3,429	3,141	2,652	2,403
July 4	3,424	2,867	2,425	2,145


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COPYRIGHT 1942 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
Oct. 17	20.2	85.6	114.7	70.1
Oct. 10	20.3	79.1	108.0	75.9
Oct. 3	19.9	76.8	105.2	76.1
Sept. 26	20.9	78.5	96.0	62.8
Sept. 19	21.0	60.6	78.8	54.0
Sept. 12	19.6	53.2	66.6	41.2
Sept. 5	16.9	32.9	39.7	26.9
Aug. 29	21.1	40.0	27.6	25.2
Aug. 22	20.2	45.5	23.7	17.5
Aug. 15	19.2	45.6	20.5	13.0
Aug. 8	19.2	41.8	12.6	24.9
Aug. 1	18.3	62.1	17.4	28.3
July 25	18.3	105.6	34.8	40.6
July 18	17.9	109.9	53.0	47.7
July 11	23.0	114.3	65.2	61.6

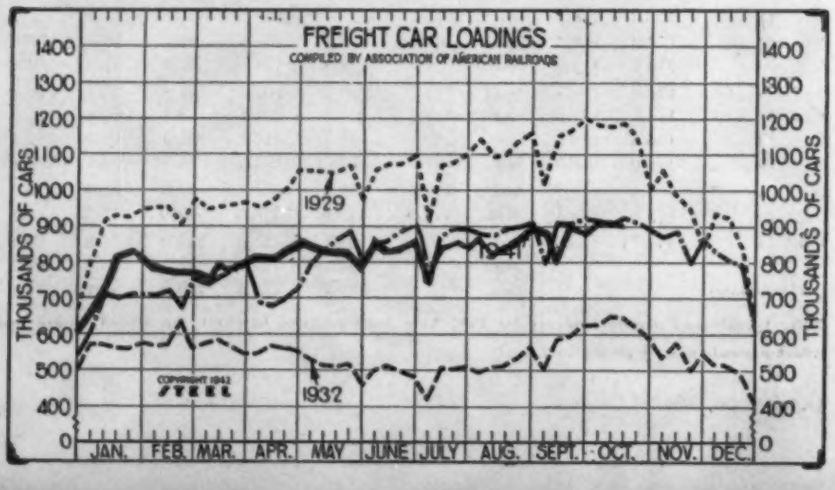
Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Oct. 17	907†	923	814	861
Oct. 10	910	904	812	845
Oct. 3	908	918	806	835
Sept. 26	898	920	822	835
Sept. 19	903	908	813	815
Sept. 12	815	914	804	806
Sept. 5	888	798	695	667
Aug. 29	899	913	769	722
Aug. 22	869	900	761	689
Aug. 15	869	890	746	674
Aug. 8	850	879	727	665
Aug. 1	864	883	718	661
July 25	856	897	718	660
July 18	857	899	730	656

†Preliminary.

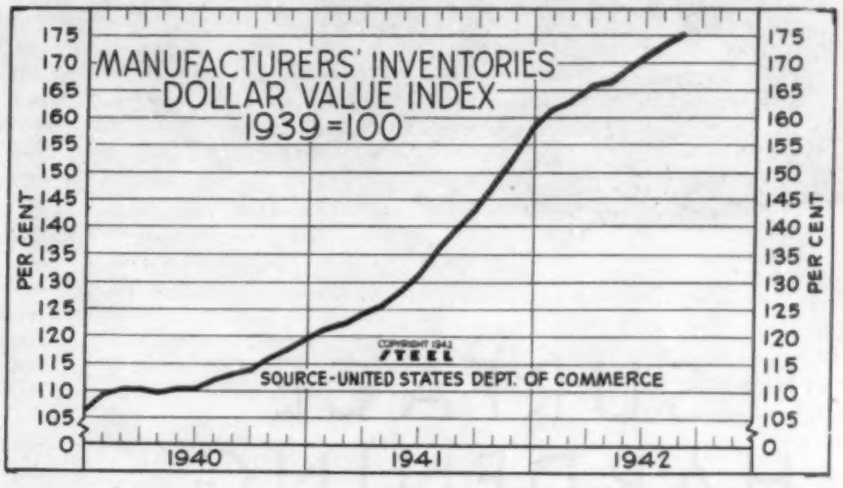


Finished Steel Shipments
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1942	1941	1940	1939	1938
Jan.	1738.9	1682.5	1145.6	870.9	570.3
Feb.	1616.6	1548.5	1009.3	747.4	522.4
Mar.	1780.9	1720.4	931.9	845.1	627.0
Apr.	1758.9	1687.7	907.9	771.8	550.5
May	1834.1	1745.3	1084.1	795.7	509.8
June	1774.1	1668.6	1209.7	807.6	525.0
July	1765.7	1666.7	1296.9	745.4	484.6
Aug.	1788.7	1753.7	1455.6	885.6	615.5
Sept.	1703.6	1664.2	1392.8	1086.7	635.6
Oct.	.....	1851.3	1572.4	1345.9	730.3
Nov.	.....	1624.2	1425.4	1406.2	749.3
Dec.	.....	1846.0	1544.6	1444.0	765.9
Tot.†	.....	15,013.7	11707.3	7315.5	

†After year-end adjustments.



Manufacturers' Inventories
Dollar Value Index

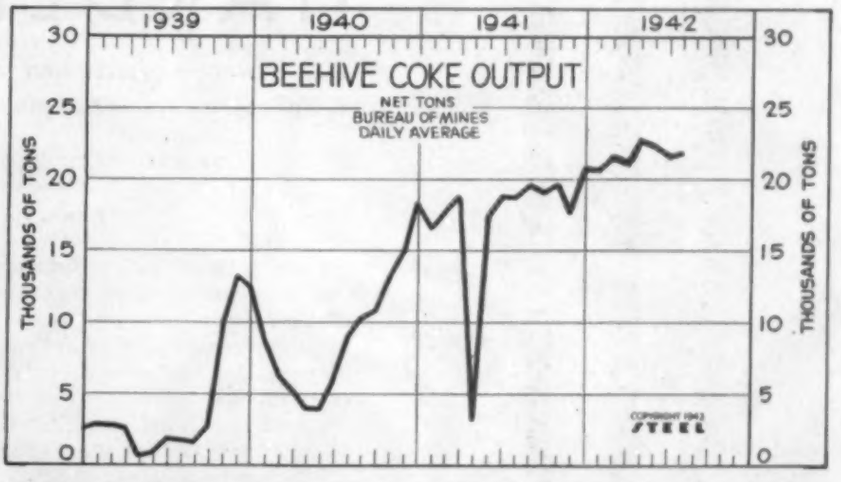
1939 = 100

	1942	1941	1940	1939
Jan.	161.9	121.8	109.5	100.9
Feb.	163.0	122.7	110.6	100.4
March	165.6	124.1	110.5	99.5
April	167.0	126.0	110.0	98.5
May	170.4	128.7	110.5	97.9
June	172.9	132.0	110.6	97.4
July	174.2	136.4	112.2	98.1
Aug.	175.4	140.0	113.3	98.8
Sept.	.....	143.4	114.1	98.9
Oct.	.....	148.3	116.2	101.3
Nov.	.....	152.7	117.7	104.5
Dec.	.....	158.5	119.9	107.2
Mo. Ave.	....	136.2	113.0	100.3

Beehive Coke Output

(Daily Average)

	1942	1941	1940	1939
Jan.	20,874	16,581	8,826	2,973
Feb.	21,771	17,729	6,212	2,954
March	21,032	18,890	5,196	2,544
April	21,843	3,100	3,928	796
May	22,571	17,458	3,930	919
June	22,487	18,803	6,036	1,992
July	22,197	18,655	8,877	1,852
Aug.	22,258	19,697	10,293	1,633
Sept.	.....	19,133	10,872	2,892
Oct.	.....	19,768	13,441	9,831
Nov.	.....	17,727	15,138	13,315
Dec.	.....	20,968	18,516	12,544
Total	.....	17,402	9,256	4,498



Construction Total Valuation
In 37 States

(Unit: $1,000,000)

	1942	1941	1940	1939	1938
Jan.	$316.8	$305.2	$196.2	$251.7	$192.2
Feb.	433.6	270.4	200.6	220.2	118.9
Mar.	610.8	479.9	272.2	300.7	226.6
April	498.7	406.7	300.5	330.0	222.0
May	673.5	548.7	328.9	308.5	288.2
June	1190.3	539.1	324.7	288.3	251.0
July	943.8	577.4	398.7	299.9	259.8
Aug.	721.0	760.3	414.9	312.8	318.1
Sept.	723.2	623.3	347.7	323.2	300.9
Oct.	.....	606.3	383.1	261.8	357.7
Nov.	.....	458.6	380.5	299.8	301.7
Dec.	.....	431.6	456.2	354.1	389.4
Ave.	.....	$500.6	$333.7	$295.9	$266.4

Fig. 1—Typical parts ni-carbed: A, pneumatic hammer cylinder; B, index plate for nut-cutting; C, special shafts; D, roll cutters; E, tapered roller for grinder shell

SURFACE HARDENING

. . . . with a description of typical ni-carbing cycles and equipment employed at General Motors

By REGINALD TRAUTSCHOLD
Consultant
Passaic, N. J.

CASE HARDENING of bearing and numerous other vital parts of mechanisms going into the building of our great armada of ships, planes, tanks and guns has been greatly furthered and considerably accelerated by the commercial application of the so-termed "ni-carb" process—by which a hard, wear-resisting outer layer is formed of even greater hardness than by conventional carburizing methods and one that compares quite favorably with the best obtainable cyanided case.

The process—invented by A. W. Machlet and developed by the American Gas Furnace Co.—combines the dual actions of carburizing and nitriding, performed simultaneously, and a *gas atmosphere* consisting of a mixture of carbon-rich gas and ammonia. Carbon is absorbed by the work surface as in ordinary carburizing; also nitrogen, as in treatment in cyanogen

baths, with distinctive effect. The presence of ammonia in the treating atmosphere imparts a harder surface to the metal, even when the parts being processed are allowed to cool from carburizing temperature gradually and slowly as when quenching is omitted.

Ni-Carb Case Characteristics: The ni-carb case so formed is resistant to corrosion and oxidation, has a tough, hard skin and is firmly bonded to the softer core. It is also entirely free from the surface deposits such as carbon precipitated in straight carburizing and salt fouling in cyaniding. Removal of these commonly entails an exacting cleansing operation that often is especially troublesome in clearing fine perforations, the threads of screws and bolts, etc.

The case, while chemically resembling that produced by cyaniding, is somewhat richer in nitrogen, particularly at the outer surface. A desirable nitride needle effect is produced that is much less pronounced in cyanide cases.

In one investigation of this peculiarity, bars of the same identical stock were processed in a cyanide bath and a ni-carb furnace to a case depth of 0.012-inch and determinations made of the hardening element contents in the respective cases—at progressive depths of 0.004-inch. The ni-carb contained about 21½ per cent more nitrogen, localized almost entirely in the first 0.004-inch cut—that is, at the surface or skin. Also, the ni-carb case ran 24½ per cent less in carbon, although the combined proportions of hardening elements, as adjusted to their respective atomic weights, were substantially the same.

Case depths of from 0.001 to 0.035-inch, or even more, have been secured by ni-carbing, and virtually all grades of steel, steel castings, malleable iron and even certain classes of cast iron can be treated by the process. Other advantages include rapidity, low cost, uniform results and absence of danger or fear of bath or pack exhaustion. The case when polished resembles in appearance a burnished nickel or chrome plated surface but is much harder, tougher and possesses superior wear resisting properties.

By employing various carbonaceous gases and variations in ammonia enrichment of the gas mixtures, the physical properties of the cases can be closely controlled and duplicated as desired, the depth of case being governed by the duration of the treatment, work temperature and cooling procedure. Furthermore, the hardening or work temperature is relatively moderate, 1600 degrees Fahr. or somewhat less, as compared with the common work heats for conventional case hardening of around 1652 to 1742 degrees Fahr. (900 to 950 degrees Cent.).

In treating steels running high in carbon content, 0.30 per cent or more, the ni-carbing process can be advantageously employed to secure superior skin effect for wear resistance. This means that while heat treating and quenching to develop maximum steel strength and hardness in the core, an extremely hard wear-resistant surface can also be produced.

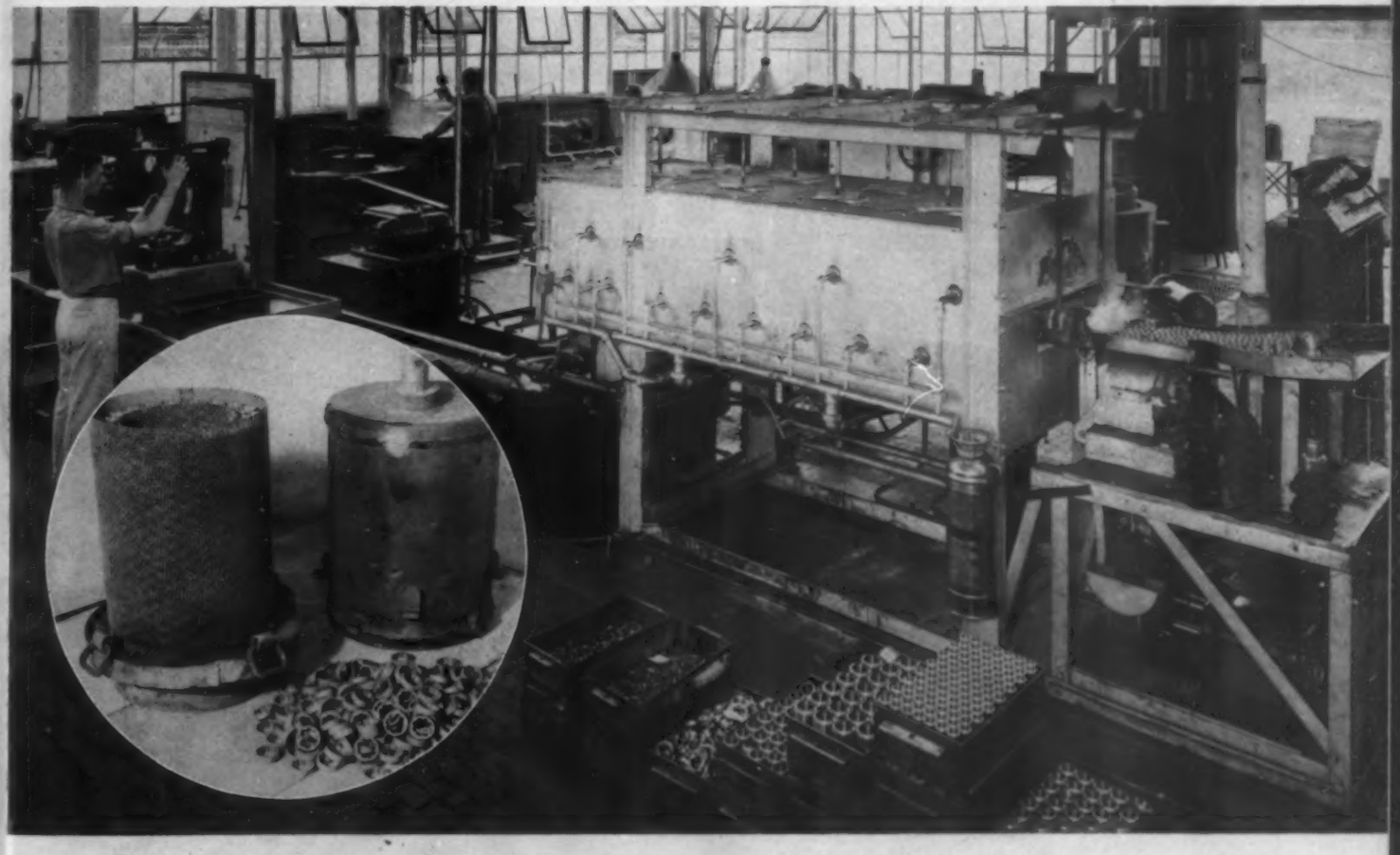
Furnaces and Commercial Applications: The extremely wide latitude afforded in commercial applications for modern systems of ni-carbing has led, naturally, to the development of several approved types of special furnaces for the work—familiarity with which equipment is no less important than an understanding of the actual process.

Case studies, rather than detailed descriptions of the furnaces in question, will be used to show the practical merits of the process most effectively. By confining these expositions chiefly to the experiences of and methods followed by

(*Please turn to Page 97*)

Fig. 2. (Encircled)—Bell retort and fixture for holding pump motor housings while being ni-carbed in bell type furnace

Fig. 3—Furnace employs unique reciprocating hearth which advances work through it by inertia



ALUMINUM....

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

(Section VII in a Series on Conservation and Substitution of Critical Materials in Ordnance Work)

Fig. 1. (Above)—To further expand our mounting plane production, America will increase her aluminum production fivefold in the next year and save every precious pound in other construction. Figs. 5, 6, 7, 8 and 9 are OWI photos, by Palmer

Fig. 2. (Left)—Casting as it comes from mold. More than half of this metal will be cut away, remelted and recast during subsequent operations

Fig. 3. (Below)—Hand loading bauxite at Bauxite, Ark. Prior to the war, mines in Saline and Pulaski counties, Ark., supplied 97 per cent of our total domestic output of aluminum, and virtually all of the recent increased production. Virginia became a competitor for the first time, a small ore tonnage from limited reserves in Augusta county having been mined recently. Bureau of Mines photo

• • • • • high on list of critical metals; world production figures; Germany gains control of world's largest aluminum industry; Japan's sources; Ordnance Department accomplishments in aluminum conservation; substitution of other materials in ammunition, and combat vehicles; aluminum not scarce—we merely require vast quantities

HIGH ON the list of critical metals whose use must be limited to the most essential applications is aluminum, that light and silvery metal which nineteenth century science gave to mankind. Aluminum, more than any other constructional material, has lent wings to our feet and, in the airplane motor, has given us the greatest concentration of power for a given weight that mechanical genius has thus far been able to devise. So far as the more mundane needs of the ground forces and the humble wants of the kitchen, we must of necessity be content with less, and be prepared to substitute iron, steel, plastics, or whatever we can get our hands on that will answer our purpose.

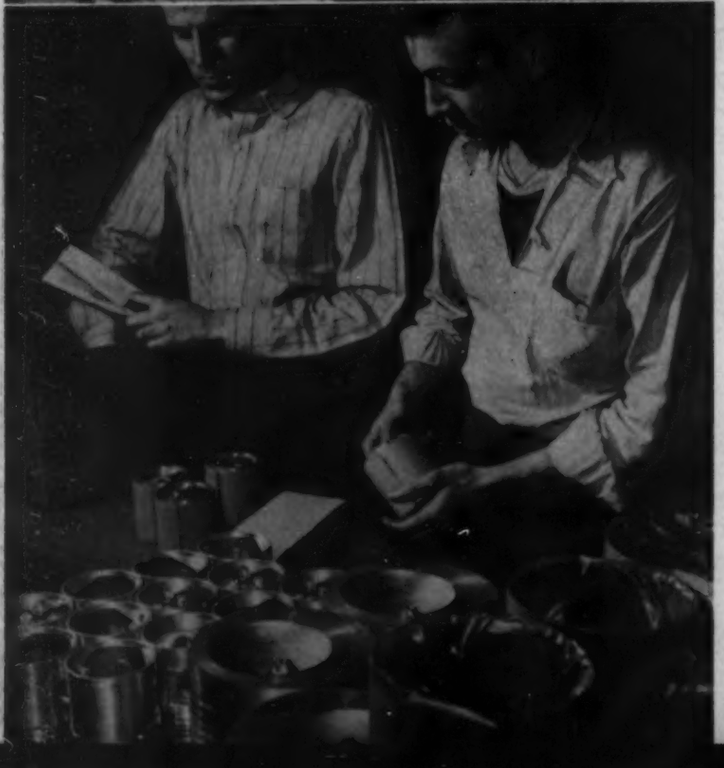
Knowing, as many do, that vast deposits of bauxite, the ore of aluminum of principal consequence, exist within our own borders, and that here in America the process by which aluminum became cheap and plentiful was discovered more than half a century ago, the necessity for economy may be the occasion of wonderment. But as in the case of other major benefits which American enterprise has conferred upon humanity, we have not maintained that leadership in production which our circumstances would suggest. Living in peace and comparative plenty through the past two decades, and untroubled by thoughts of war and echoes of possible war in far off lands, we failed to note the writing on the chart —a legend whose meaning is all too plain now that the evil is upon us.

Let us take a look at Fig. 8, taken from *Minerals Yearbook of the Bureau of Mines*. The thick black line on the upper portion of this chart exhibits world production of aluminum from 1913 to 1940. Note how it rose gently during the years of the first world war (war craft were few in those days). The rising tide of prosperity of the late twenties undoubtedly was responsible for the next climb; but see how it rose after Hitler came to power. Somewhere in the world, there was a most unnatural demand for this vital stuff; but meantime our production idled along. The piping days of peace, of NRA and PWA and a New Deal for the common man were still with us. Elsewhere, other men had other plans for a re-schuffle.

A word or two about the origin and manufacture of aluminum may answer some of our questions concerning our apparent inability to provide for our every war and domestic need. Although one of the commonest elements in the crust of the earth, the oxide bauxite presents the simplest problem of separating the metal from its inevitable associates. Even so, Davy and many another famous chemist had tried his hand at developing a ready means of isolating aluminum before Charles Martin Hall, the son of a minister of the gospel in Ohio, found the answer in his father's woodshed, thanks to the inspiration of a chemistry instructor at Oberlin college where the boy went to school.

In brief, young Hall discovered that molten cryolyte—a flouride of sodium and aluminum found in the natural state at Ivigtut in Greenland— would dissolve aluminum oxide and that the solution was a conductor of electricity. The dissolved alumina, furnishes aluminum and oxygen ions which are driven to the cathode and anode respectively. Thus the aluminum deposited on the carbon walls of the bath, being heavier than the rest of the contents, sinks to the bottom and so may be tapped.

Fig. 7 shows a section through a modern aluminum furnace. The apparatus consists of a rectangular shell which has a refractory lining for purposes of insulation; within this is placed carbon which functions as the cathode. The size of these furnaces varies, the interior dimensions being some 8 by 4 feet by 20 inches deep. The anodes consist of a series of carbon bars, suspended by adjustable rods so that they dip into the bath. The electrolytic consists of fused cryloyte or cryloyte and fluorspar maintained at a temperature of some 1650 degrees Fahr. by the passage of the electric current and kept warm by dropping powdered Al_2O_3 from an overhead hopper on to the crusted oversurface of the bath. The powdered ore is added to



the bath as may be required by breaking the crust and stirring it in.

Among the "bottlenecks" in the provision of larger facilities for the manufacture of aluminum is power, some 10 to 12 kilowatt hours being required to produce a pound of the metal. If our anticipated annual production rate of a million tons is realized by next year—a five-fold increase over 1939—*more than 20 billion killowatt hours of electric power will have to be provided.* This will take more than half of our normal electrical output.

The writer vividly recalls the impression which this power requirement made upon him on the occasion of his first visit to an aluminum plant more than 30 years ago. Nestling at the head of Loch Leven in Argyllshire, Scotland—one of those long invading sea lochs that deeply indent the west coast of the island—are the works of the British Aluminum Co. Back in the mountains, some 5 miles away is a huge dam, 80 feet high at the center and 60 feet wide at the base, thrown across the lonely moor of Rannoch to give a storage capacity of three and a third billion cubic feet of water at an elevation of 1065 feet.

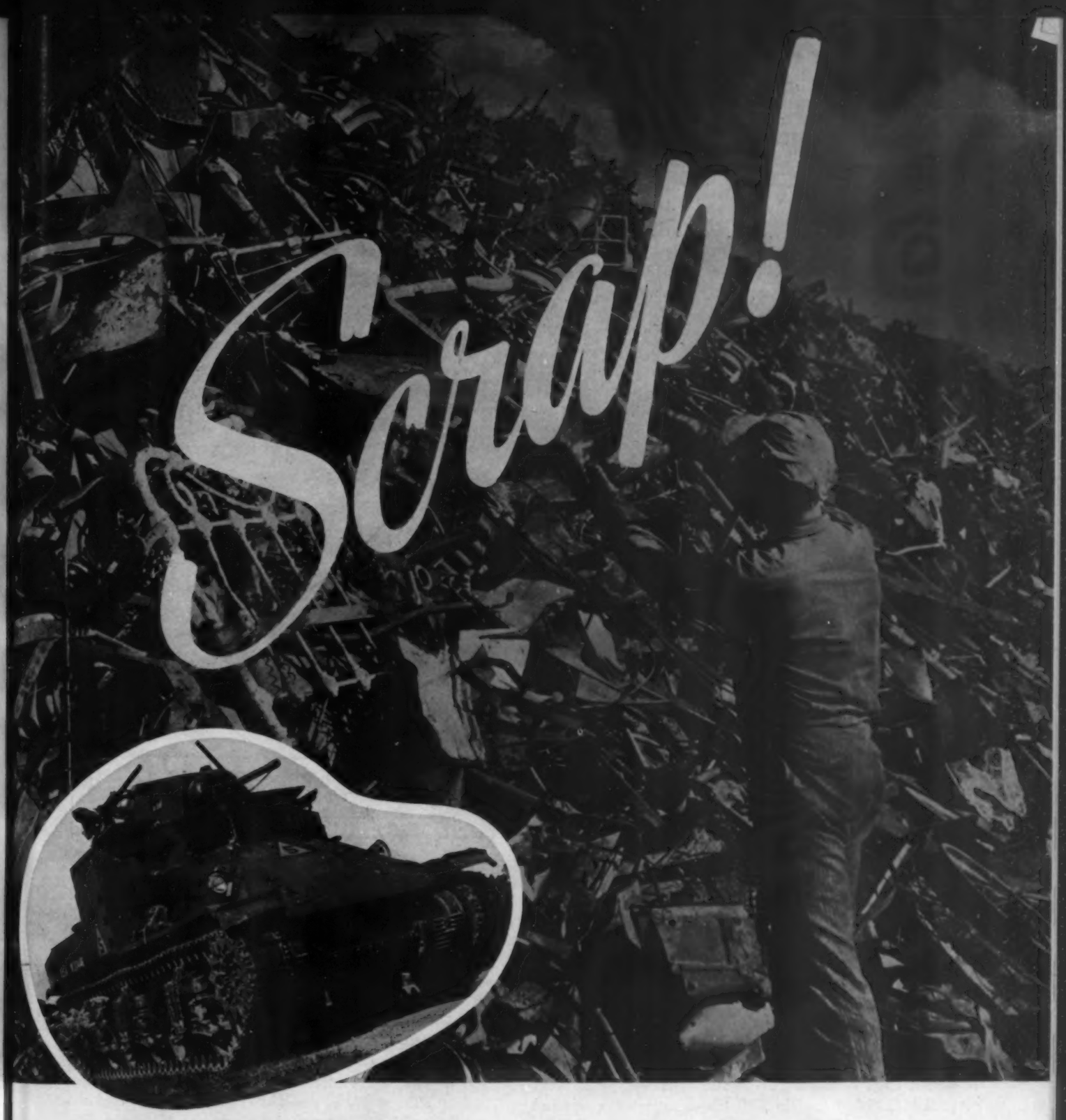
For three and a half miles the water flows in a reinforced concrete conduit, 8 feet wide and 8 feet deep, with a fall of 1 foot in a 1000 before it enters the six lines of 89 inch welded steel pipe which snake down the mountain side, and swing against their concrete anchors on their way to the Pelton wheels. Four hundred cubic feet of water under a static head of 950 feet enter the nozzles every second to produce 25,000 horsepower, all of which is absorbed in the electrolytic cells. Watching the row of turbines so quietly at work, and looking out upon the sunlit, heather-clad hills which so often in the past had resounded to the clash of arms, I thought, all these years ago, that our feet were set at last in the ways of peace. But to the present . . . .

With these figures of our actual and potential production before us—figures which indicate that we will shortly be producing more aluminum annually than the total world output in 1940—we may well inquire first how long we can keep this up and next as to the situation of our enemies. Fortunately for us the mines of Saline and Pulaski counties in Arkansas and those in Alabama, Georgia and Virginia can give us all the ore we need, at least for several years. Had not our peace-time consumption in the past been largely supplemented by imports from South America, however, our limited commercial ore reserves would have been depleted to a dangerous extent. And we do also have considerable quantities of lower-

Fig. 4. (Top)—Aluminum paint offers admirable protection for steel against corrosion. This naval gun mount chassis is being coated with it before proceeding to assembly operations in a midwestern plant

Fig. 5. (Center)—Workman brushing and inserting cores in an assembled mold for casting aluminum—one of the delicate operations required of skilled workmen in a large midwestern aluminum foundry. Office of War Information photo, by Palmer

Fig. 6. (Bottom)—Finished aluminum pistons for army jeeps being wrapped for shipment. Aluminum pistons are but one product of a giant midwestern factory wholly converted to war production



SCRAP OR JUNK— whatever you call it—the war hinges on it. Thirty thousand pounds of scrap is needed to produce just one fighting tank. America's production goal for 1942 is 45,000 tanks . . . to be increased to 75,000 tanks in 1943. You, in your plant, can help to turn the tide of battle. Idle machines, discarded tools, broken equipment are Axis saboteurs until they reach your local scrap dealer. Salvaged—they become vital links in the chain of Victory. Give someone in your plant the authority to scrap old equipment. Better "too much and too soon" than "too little and too late." Send your scrap into battle today.

ALAN WOOD STEEL COMPANY, Conshohocken, Pa.

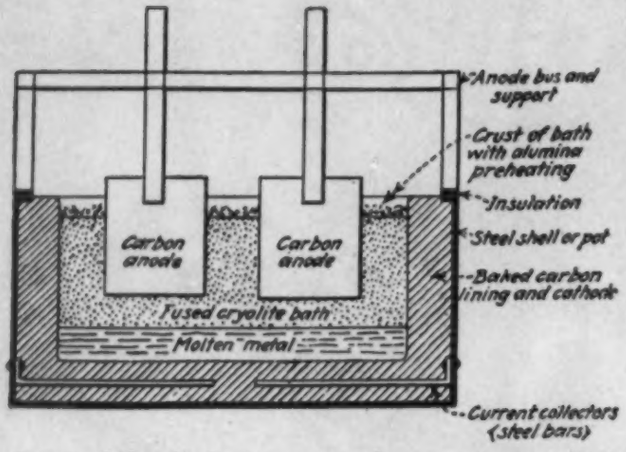


Fig. 7. (Above)—Section across aluminum furnace. Units average 8 feet long, 4 feet wide, 20 inches deep. Anodes extend in two lines along length of pot. Additions must be made to bath to compensate for deterioration. Anode consumption nearly equals weight of aluminum produced; while that of cryolyte is about 10 per cent. From Chemical and Metallurgical Engineering

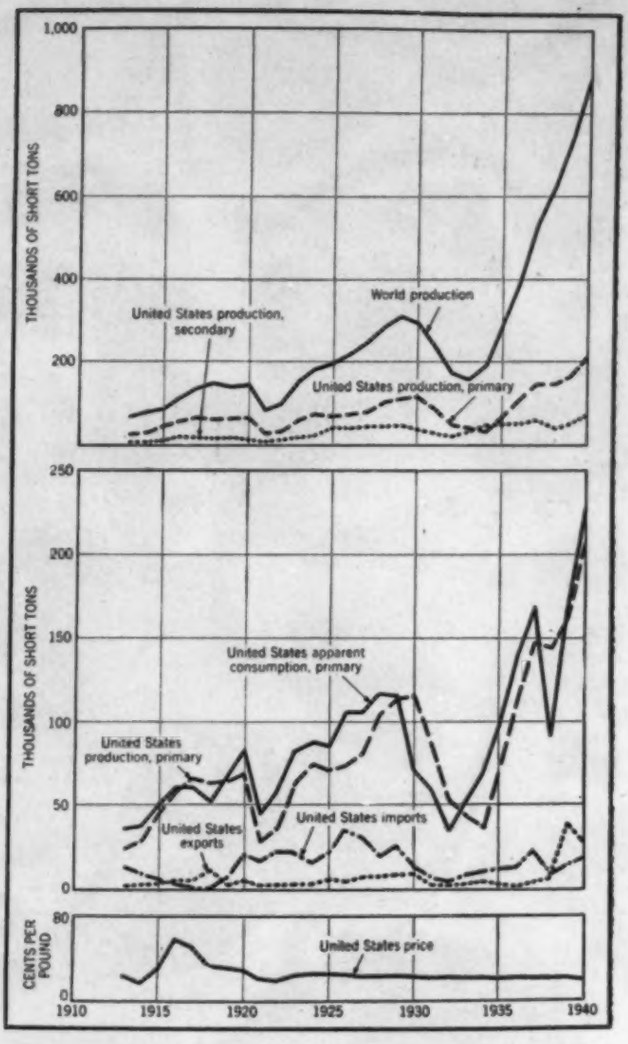


Fig. 8. (Right)—Trends in production, imports and exports, apparent consumption and average quoted prices of aluminum, 1913-40. Central chart shows United States' imports and exports, also primary production and apparent consumption. From United States Bureau of Mines

grade high silica ores which could be used at greater cost, should it become necessary.

By early 1941, Germany had gained control of the largest aluminum industry in the world; the occupation of France having made bauxite mines, alumina and aluminum plants available; and the rape of Norway and Denmark, cheap hydro-electric power and huge stocks of Greenland cryolyte. This last mentioned essential may, however, be really produced artificially according to the reaction,

$$3\ Na_2O + Al_2O_3 + 12\ HF = 2Na_3AlF_6 + 6H_2O$$

sodium carbonate being used, if desired, to supply the soda.

Despite these fortunate acquisitions, there are evidences that all is not so well with our foes. German planes, recently shot down, give evidence of aluminum shortage, forgings especially being conspicuous by their almost entire absence. In years gone by, Japan has imported large quantities of bauxite from the Netherlands Indies (235,000 tons in 1940) and from the Federated Malay States (59,000 tons in that year). Since it takes about 2 pounds of bauxite to produce one pound of aluminum, we observe that these two sources alone were capable of providing the Empire of the Rising Sun with close to 150,000 tons of metal annually.

The principal claim of aluminum on our notice is, of course, its extreme lightness (a tenth of a pound per cubic inch), coupled with considerable strength. Indeed, when suitably alloyed with copper, silicon, manganese and so forth and heat treated, it exhibits tensile strengths comparable with mild steel. Thus, of the finished weight of the average military airplane, aluminum comprises about 69 per cent of the airframe, 23 per cent of the engine and a large proportion of the propeller.

The Ordnance Quartermaster and other divisions of the Army and Navy have also freely employed it in the manufacture of fighting equipment and for transportation, rolling field-kitchens, mess kits, etc. The only potential rival of aluminum is manganese which is superior in strength to most other metals on an equal weight basis. Its strength, however, decreases with temperature and in general, magnesium alloys are not suited for use above 400 degrees Fahr.

Professor Jean Piccard recently pointed out to the author that magnesium alloy sheets have much *greater rigidity than sheets of equal strength* made of aluminum or alloy steel, on account of their greater thickness. He also indicated that he had solved the problem of corrosion by suitable surface treatment.

Although aluminum and its alloys now constitute the principal structural material in fighting aircraft, there are indications that the use of aluminum alloy castings is steadily increasing as a result of more rigid control of manufacture in the shape of X-ray analyses and destructive tests.

And furthermore, the tensile and compressive strength of strong aluminum alloys used in aircraft has been increased by prestretching and precompression of the metal. Finer grain structure, induced by hot-pressing and kneading of the billets for propellers and other parts, has also

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been a factor in the steady improvement of physical characteristics.

New extrusion techniques and stamping processes involving the use of rubber pads in conjunction with simple wooden or metal dies have also increased its availability. Translated in terms of air superiority, these advances may well give our machines the speed and altitude which spell ultimate control of the air in every quarter of the globe.

With a full realization of the prime importance of substituting different material, such as steel or plastics for parts now made of aluminum, the United States Army Ordnance Department has embarked on an extensive substitution program involving changes in ammunition components, parts of tanks and combat vehicles and small arms—an effort which, it is estimated, will save some 25,000 tons of primary aluminum before the end of this year, and about 60,000 tons next year.

Further, it has been found possible to substitute die casting made from secondary aluminum for parts machined from primary bar stock. This not only saves primary metal, but cuts the losses resulting from machining operations. About 4500 tons of secondary aluminum will be utilized in this way in 1942 and some 12,500 tons next year.

Based on conditions as they exist in February of this year, the recommendations of the Joint Aluminum Committee of the Army and Navy Munitions Board and the War Production Board, there are indications that savings will lie somewhere between 30 and 60 per cent of estimated requirements; the former figure being doubtless on the conservative side and the latter perhaps too optimistic.

One of the most interesting substitutions for aluminum concerns the use of plastics for the fuses of certain mortar shell. The three parts affected are the body, head and booster cup; these having been machined from bar stock in the case of the body and head, the booster cup being made from a diecasting of primary aluminum. As in the case of all ammunition components, a high degree of reliability is demanded. Hence, extensive proof firings were necessary. The plastic parts stood up, however, and are now in production.

The plunger head of another type of fuse has been provisionally made of secondary aluminum diecastings, and firing tests are under way. An attempt to use fine powdered aluminum in the manufacture of the metal sleeves and plungers of still another fuse has indicated that further tests must be made before definite results can be predicted. Tests of these parts made from secondary aluminum will be conducted.

As far as fire control instruments are concerned, virtually only secondary aluminum is now employed; but a study is being made to determine the possibility of substituting zinc base diecastings for certain parts. Experiments are also being carried out aimed at eliminating aluminum castings from tanks, especially in transmission housings and crank cases. A test was conducted using alloy cast iron for the transmission housing, with successful results. However due to the distribution of shock loads in service, there is considerable concern over the low impact resistance of cast iron. Thus an attempt is being made to use malleable iron.

Experimental work is also under way at motor plants where new motors using cast iron to replace certain aluminum parts, are under test. These cast iron parts increase the weight of the motor some 50 per cent and, what is perhaps of more serious consequence, also reduce the efficiency. It would appear therefore, that we have just reached the limit of what may be accomplished in this field without lowering military effectiveness.

Offering rather less promise than any of the foregoing is the proposal to substitute powdered secondary aluminum for primary aluminum in incendiary ammunition. Such tests as have thus far been carried out have not been by any means favorable, but development work is still proceeding.

And now finally a word about the total cost of aluminum we expect to use next year, despite all possible anticipated

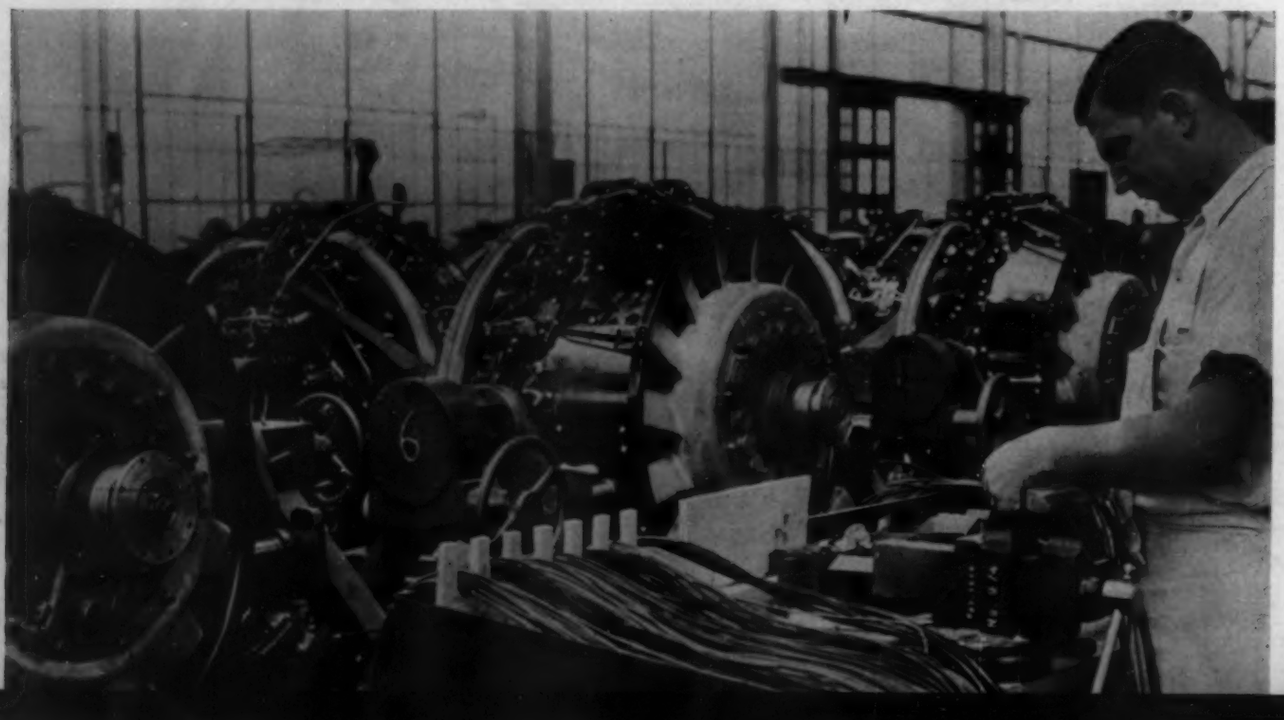


Fig. 9—M 3's, the 28-ton medium tank, is powered by these 400-horsepower Wright Whirlwind aviation type engines. Tank engines have been studied by Ordnance Department in an effort to reduce amount of aluminum used

FINE TOOL STEELS FROM A FAMOUS TOOLMAKER

Disston has been making high grade tools for more than a century. Henry Disston, to meet his own exacting requirements, melted the first crucible saw steel made in America, in 1855. It was at the Disston plant in 1906 that this country's first commercial electric saw steel was produced.

Disston continues to manufacture steel for its tools today—steels which must measure up to the standards of a toolmaker with a world-wide reputation for quality. That is why in the Disston steel plant you find modern electric furnaces; highly skilled personnel; the most expert and accurate metallurgical and chemical supervision.

It is possible with selected materials, precise controls, special equipment and experienced craftsmen to produce Disston Tool Steels with highly desirable characteristics — to precise specifications.

Selecting the best tool steel for the job:

Disston engineers and metallurgists will, without obligation, help you determine the right tool steels for better performance and longer tool life . . .

If you have not received your *free* copy of the illustrated 73-page book, "Disston Tool Steels," write today to Henry Disston & Sons, Inc., 1026 Tacony, Philadelphia, Pa., U.S.A.

DISSTON CONSERVATION CONTROL CARDS . . .

Send now for these cards which contain valuable information on the selection, working and application of six different types of tool steels. The cards are supplied *without charge*, as a feature of the Disston Conservation Control Plan to save essential tools and materials.

saving. Thanks to young Hall, the price of some $6.00 to $8.00 a pound (at which it stood prior to the development of his process at the hands of a group of Pittsburgh business men back in the 80's of last century) was first reduced to $5.00 a pound and later to $2.00. Within recent years the price has dropped from 20 cents to somewhere in the neighborhood of 15 cents. Even so, two billion pounds will cost the taxpayer $300,000,000, a sum not far short of the cost of building the Panama Canal.

Until recently, the Aluminum Co. of America originally founded to exploit the Hall process, was the sole manufacturer in this field. Two competitors, the Reynolds Metals Co. and the Olin Corp. have appeared, however, and expect to have about a 20 per cent share in next year's output. Vast expenditures for increased facilities and for research have been made including a large expansion in aluminum reduction facilities at Alcoa, Tenn. and Vancouver, Wash. A 375 ton addition to the aluminum plant at Mobile, Ala; a new carbon-electrode plant at Vancouver, Wash: (annual capacity, over 50,000 tons); a bauxite crushing and drying plant at Paranan, Surinam; together with the extension of casting and forging plants, and construction of a new extrusion plant at Los Angeles; and so on through a considerable list of expanding facilities in the field of aluminum production and processing.

The necessity for economy does not mean that our fighting forces will be hampered in any important respect by scarcity. Early in 1941 when it became evident that the supply of aluminum would not suffice for all civilian as well as defense needs, the metal was placed on the priorities critical list, enabling the Army and Navy to issue preference ratings against it. This of course, was merely a beginning. War orders were given A preference ratings and non-military orders, ratings from B2 to B8, which allotted manufacturers certain stipulated percentages of their 1940 average consumption of low and high grade metal. The division, however, reserved the right to issue higher ratings for important civilian needs above less important military needs. As time goes on it will become less and less easy to distinguish between military and civilian.

All of us, whether soldier, sailor, tinker or tailor, are in total war and must adjust our needs accordingly.

Photographic Device May Boost Gasoline Mileage

Automobile owners, in the future, may be able to squeeze more miles out of each gallon of gasoline if a recently announced electric spark photographic device for snapping split-second portraits of liquid spray can be adopted by engineers.

Developed by Samuel Gilman, 30-year-old research engineer at the Westinghouse Research Laboratories, the spray analyzer already has been used to photograph water drops one-thirtieth the size of a pin head. It is said to have possibilities in studying liquid sprays inside carburetors, diesel engine fuel injector systems and similar machinery.

By using the device, it is believed automotive engineers can determine the exact size of gasoline drops in the carburetor. They also can find out whether or not the spray is uniformly distributed throughout the carburetor.

In photographing spray, the tiny particles cut off the light passing from the electric spark to the camera and are recorded on the photographic plate as a shadow of white dots. These prints then are enlarged 65 times by throwing their images on a ruled screen for measurement.

Copies of Recommendation On Files Now Available

Printed copies of simplified practice recommendation R6-42 "Files and Rasps", are now available, according to the Division of Simplified Practice, National Bureau of Standards, Washington.

Heretofore the recommendation listed only standard lengths of each type of file and rasp. Present revision supplements this with detailed dimensional standards covering width, thickness, range of file teeth per inch, the number of rasp-teeth per row and rows per inch and tolerances. The scope of the recommendation has been enlarged to cover straight and curved-tooth milled files, and detailed standards for this type are also included. Copies of the recommendation may be obtained from the superintendent of documents, Government Printing Office, for 5 cents each.

Substitutes Wood for Steel in Rolling Doors

Since wartime use of metal has limited the use of steel rolling doors, Kinnear Mfg. Co., Columbus, O., has turned to wood as a substitution. According to the company, incorporation of the same upward-operating principle used in the steel rolling door, enables the product to provide the same advantages as the steel door.

Standardized Shell Taps Expedites Deliveries

Standardization of special taps for tapping both ends of 20 and 40 millimeter shell by Detroit Tap & Tool Co., Detroit, is speeding up both production and deliveries, according to the company.

A year ago, it reports, virtually every shell manufacturer had his own special tap specifications and designs for the same operation. Since the compromise or standardized designs were developed, over half the shell producers the company supplies have adopted the new taps. This has made possible the manufacture of the taps on a quantity-production basis, expediting delivery.

Announces Report on Storage of 1:3 Butadiene

A 36-page report on the "Storage of 1:3 Butadiene", prepared by the Pittsburgh-Des Moines Chemical Storage Fellowship at the Mellon Institute of Industrial Research, Pittsburgh, is now available to those who are concerned with the storage of this substance. Information and data on variables which affect storage costs, recommendations for types of storage containers, cost data, information regarding corrosive effects on container materials, and deterioration of butadiene during storage form part of the report.

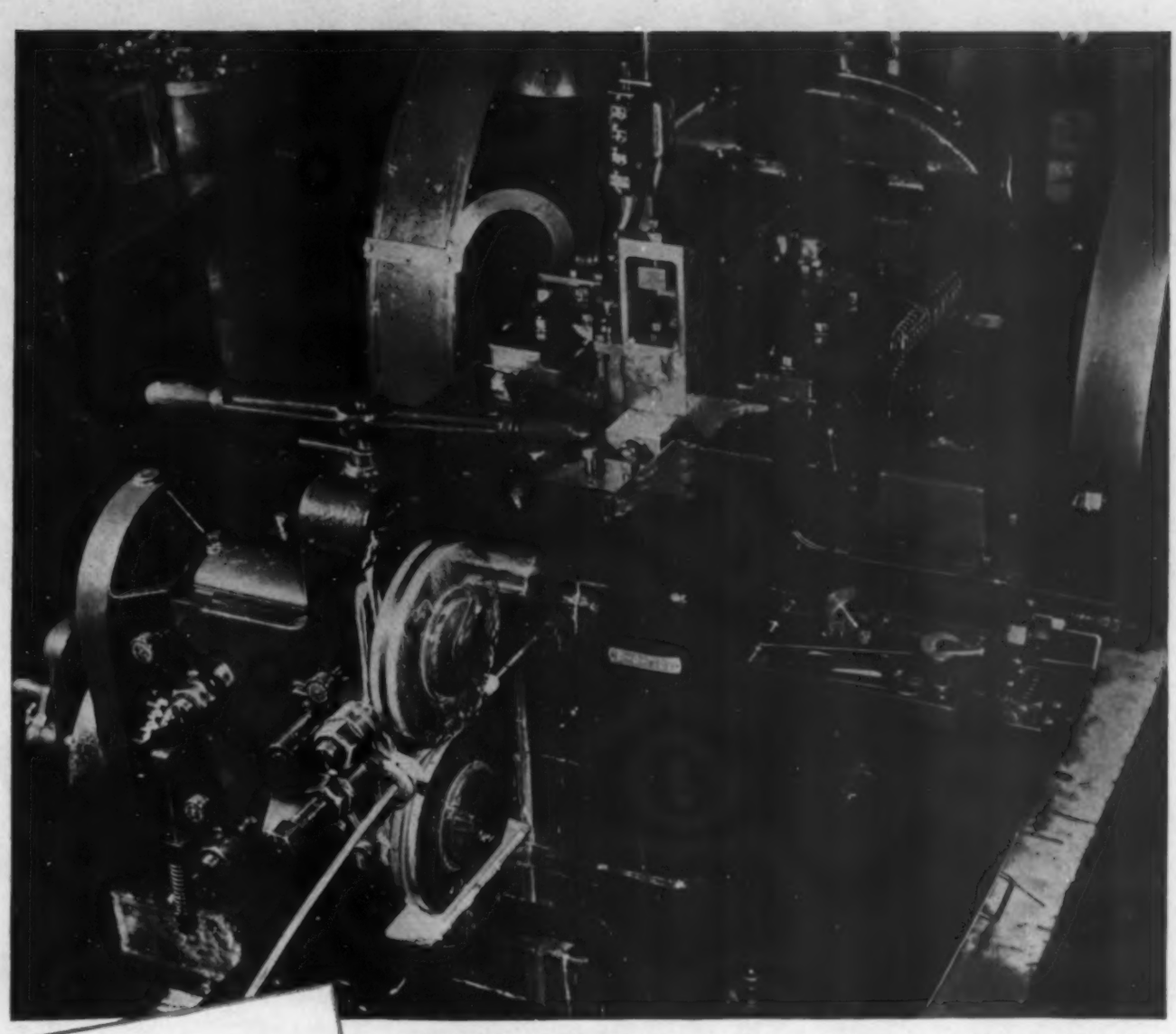
"Torchy Turner" in Charge of House Organ

"Torchy Turner" Takes over.

He is now in charge of *Turner Topics* and from now on he will be the fellow who will give you the tips on the use of blow torches.

According to Turner Brass Works, Sycamore, Ill., Torchy welcomes all problems and questions. He is anxious to aid the war program by providing distributors, dealers and owners with information that will enable the users of blow torches to get maximum efficiency and service.

The publication, *Turner Topics*, is offered free upon request.



The illustration shows a typical header on which R B & W bolts are "upset" — the best method for insuring strength. Bolts headed by this method require the use of better and more uniform raw material — thus a double reason for stronger heads. Photomicrographs show perfect continuous flow lines and grain structure.

They'll keep their heads when the guns go off!

FIRE A 155MM HOWITZER and feel the ground jump under your feet. Let go a 16-inch shell from a battleship turret and feel the recoil shake your spine. Then decide: do bolts and nuts have a job holding a gun platform together?

You could tell from the orders arriving this morning at our great one-purpose nut plant at Coraopolis, our bolt factory at Rock Falls, our main plant at Port Chester . . . how highly the shipyards and arsenals respect the *holding* power of R B & W bolts and nuts.

Behind-the-line fighters, too, in increasing numbers, are R B & W fastened . . . plows and harvesters that roam the earth for food, and mining tools that dig it for metal . . . trucks and railway rolling stock that rush the goods cross-country . . . machinery and power plants and airplane hangars that help us "put on the heat" to win the war.

R B & W workers, knowing the importance of Empire products, are putting on their own brand of "heat" to keep the war industries supplied.

Russell, Burdsall & Ward Bolt and Nut Company. Factories at Port Chester, N.Y., Rock Falls, Ill., Coraopolis, Pa.; sales offices at Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, Portland, Seattle.

RB&W **RUSSELL, BURDSALL & WARD**

Making strong the things that make America strong

EMPIRE

AND ALLIED FASTENING PRODUCTS . . . SINCE 1845

Hammered Resistance Welding

. . . . produces good weld without flash or fin and with low power consumption

HAMMERED resistance welding is a recently developed combination of the tube butt weld and edge flash weld procedure except that no flash or fin is created and no fireworks take place because the welds are of a progressing continuous-time type.

Originally the process was conceived to make steel spiral-wound large-diameter thin-wall pipe. See Fig. 1. The same idea was then tried on straight seam-welded formed steel tubing and more recently on butt welding flat strips edge to edge to simulate the requirements of a strip mill welder. See Fig. 2.

In simplest terms, the welder consists of a pair of current feeding rollers or shoes in contact with the top surface of the two pieces to be joined and an air-operated or electrically operated hammer between these rolls and above the edges to be joined—the purpose of the hammer between these rolls and above the edges being to bring the edges together and to create a rapid hammering forging action on the joint as it is heated and fused together and after welding during the cooling cycle if desired. In other words, it is the old blacksmith's weld made with electric edge contact resistance heating means.

As to advantages of this process over others, the greatest contrast is to be found in comparing this method of joining edges to the flash welding process.

—Electrical kilovolt-ampere input or demand required is about one-fifth that required for flash welding to do the same job in the same time.

—The cost and mass of the apparatus is conservatively about one-third that of flash weld apparatus to do the work.

—The weld-metal joint produced is at least equal to that of the flash weld and can be controlled as to finished thickness and hot or cold forging action.

—No metal is heated that has to be cut off and thrown away—that is, no flash or fin—thus eliminating need for an extra operation.

In these days when use of central-station power-supply systems is to be conserved by keeping demand charges and surges at a minimum, this process has something to offer for the making of war munitions.

Compared to conventional welded tube mechanisms the mass of the apparatus and its cost may be considerably less since instead of heavy continuous high-pressure rolls, the intermittent impact action of the hammer blows means that the same effect may be attained with lighter apparatus. No data is available as to comparative power consumption of the conventional tube butt weld as against the hammered weld; it is felt that because of the intermittent hammer blows edge contact resistance is higher at the weld with consequent lower current called for to produce needed heat.

In the hammered resistance weld the metal, during the actual welding properly controlled, shows no sparking while the hammering action joins the sheets. The heated metal, immediately following the hammer, has a dull dark red color.

Typical pull tests on uniform section coupons welded by this method showed that mild steel of 50,500 pounds per square inch tensile strength broke outside the weld zone at 50,600 to 51,200 pounds per square inch. Hardness tests show the as-welded metal in the weld zone harder than the original plate where no annealing rolls are used.

For example, where the plate showed hardness of 45 rockwell B, the welded zone itself showed 65 rockwell B. At the roller contact points, where the current entered the plate, and where roll pressure exerted a cold working effect, the unwelded plate showed a hardness of 68. This weld-zone hardness can be controlled by after-heating rolls or other annealing means if desired.

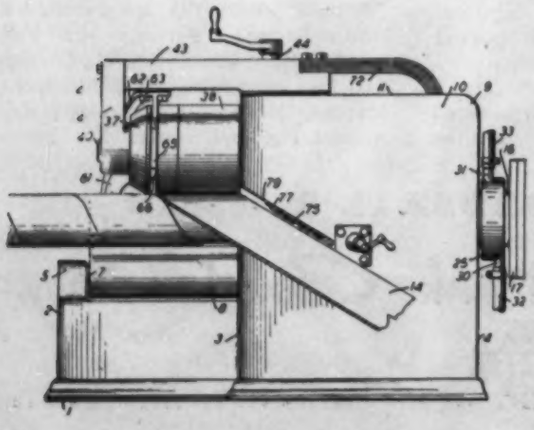
As to the metal structure in the fusion zone, metallurgically, the steel became molten or approached the melting point to permit actual welding of the separate pieces of steel strip. The microstructure as welded shows a tendency toward the Widmanstatten-type structure commonly associated with cast structures.

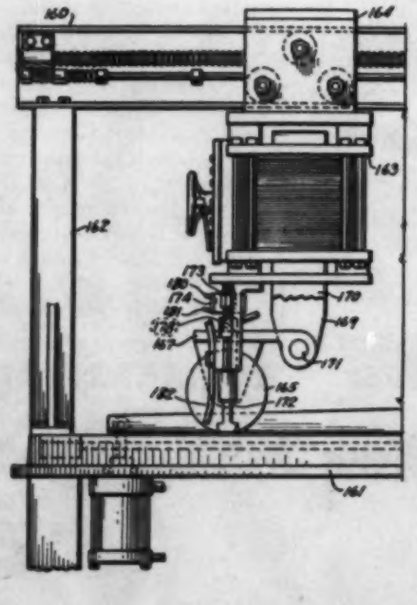
From a paper presented by A. L. Pfeil, president, Universal Power Corp., Cleveland, before a meeting of Cleveland and Youngstown section of the Association of Iron & Steel Engineers; and published in *Iron & Steel Engineer* of August 1942.

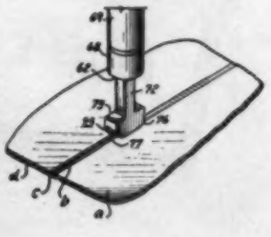
Fig. 1. (Left, below)—Original spiral pipe welder making hammered resistance welded joints that convert strip into pipe

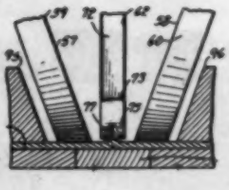
Fig. 2. (Center)—Flat strip welding machine showing location of hammer right above point of fusion between the 2-wheel type electrodes of the resistance welder

Fig. 3. (Right)—Closeup of hammering tool and its location between wheel electrodes









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You will get greater production between roll changes with all stands of your rod, merchant and bar mills equipped with "Techni" Process alloy iron base rolls, for they roll more tons for each roll dressing. "Techni" Process Rolls have greater strength, excellent finish, unusual wearing qualities, resistance to slippage and fire cracking. Mackintosh-Hemphill and "Techni" Process will assist you in getting the most production from your mills.

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MACKINTOSH-HEMPHILL COMPANY . . . Pittsburgh and Midland, Pa.

The Rolls with the Red Wabblers

They Roll More Tons Per Roll-Dressing

WILL OUR CANNON PARTS *Change Your Future?*

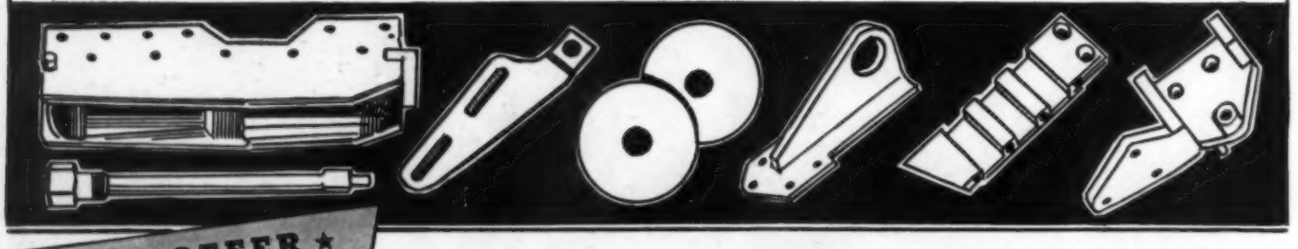
★ ★ ★ When the shooting ends in Victory for the United Nations, the company having access to the latest production ability will survive the pains of reconstruction.

★ ★ ★ The warning is plain. Now is the time to plan ahead! Now is the time to line up sources of production!

★ ★ ★ The best place to find this help is in the present war production industry. For instance, we at Spriesch are supplying the war effort with aircraft armament, Cannon Parts, Bomb Release Shackles, Automatic Bomb Release Racks complete... plus aircraft hardware. Each part is made to exact specifications, yet must be rushed out under emergency schedules.

★ ★ ★ To meet this problem we have supplemented our long experience with original methods entirely new to industry, plus latest type machines and tools.

★ ★ ★ Clearly, by planning now to use the facilities of Spriesch modern war production ability, you will be a step ahead of your competitors. A step that may change your future to leader in your field! Joseph J. Cheney, President.



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It is titled "INGENUITY" and it pictures our complete facilities.

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Spriesch

Established 1923

Tool & Manufacturing Co., Inc.

10 Howard Street **Buffalo, New York**

NEMA Publishes Standard On Enclosed Switches

A new publication entitled "Enclosed Switch Standards" recently released by the National Electrical Manufacturers Association, 155 East Forty-fourth street, New York, includes general performance, ratings and marking standards for air break switches having their current carrying parts enclosed in metal cases and enclosed switches with or without provision for plug or cartridge enclosed fuses.

One section devoted to general standards covers switch types, enclosures and enclosure specifications, operating mechanisms and spacings, wiring space and terminals. Another covers performance standards and includes temperature limitations, overloads, endurance and dielectric strength tests. The part devoted to ratings deals with voltage, current and horsepower ratings of fusible enclosed switches. Copies of this handbook may be obtained from the association for 60 cents each.

New Soft Plastic May Relieve Rubber Situation

Soft formations of ethyl cellulose plastic developed by Hercules Powder Co., Wilmington, Del., it is reported, can be substituted for rubber in gun covers, "friction tape", water tubing to replace brass, raincoats and footwear. It also is said to be resistant to mustard gas.

The product is a comparatively new development in plastics, most of which heretofore have been hard. Ethyl cellulose when compounded with oil and chemical plasticizers in the range of 40 to 60 per cent ethyl cellulose and 60 to 40 per cent plasticizer, produces compositions having many of the qualities which have made rubber applicable to numerous products.

While not suitable for tires or inner tubes as presently developed, the product would probably be suitable for rubber applications which before the war consumed 60,000 tons of rubber, according to the company.

How Industry Can Prevent Sabotage

Plant Protection, by E. A. Schurman; 148 pages, 5 x 7¼ inches, cloth; published by Cornell Maritime Press, New York, for $2.

This is a handbook for American industry, factories, mills, docks and shipyards, dealing with the organization and administration of a guard force to prevent sabotage or espionage in both small and large plants.

The author is chief of protection for Glenn L. Martin Co. and brings to the volume the experience gained in organizing to protect its large plants. The uniformed force of the United States secret service and the protection department of the Martin company provide the standards upon which the handbook has been prepared.

The volume contains an organization structure and operations plan suitable for a force of any size, which can be widely extended for an increased staff or by simple modifications be applied to a small organization. Chapters are included dealing with self-control, self-defense, fire hazards, espionage and sabotage.

Develops High Temperature Resistant Metal Coating

A coating which will prevent formation of scale and oxidization when applied to metal surfaces subjected to direct flame is announced by Carbozite Corp., First National Bank building, Pittsburgh. Developed to resist the deleterious effects of temperatures up to 2000 degrees Fahr., it also is adaptable for application on the inside of fire walls to prevent the spalling of mortar and brick. The coating also is being offered in various colors.

Gray Mills Coolants Offered In Wooden Containers

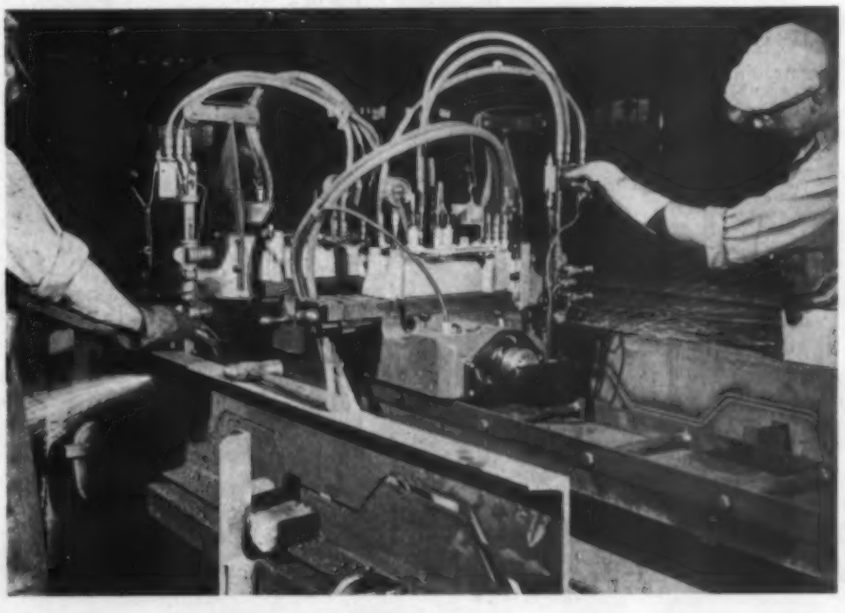
New line of Flo-Bac metal cutting coolants recently developed by Gray-Mills Co., Chicago, is being offered in container sizes of 3, 5, 15, 30, 50 and 55-gallon units to accommodate shops not able to handle large quantities. The coolants are made in four types to cover practically every requirement and are available in wooden containers on priorities up to A-10.

Builds "First" Synthetic Rubber Conveyor Belt

An all synthetic rubber conveyor belt, believed to be the first of its kind made entirely from Buna S synthetic rubber, is reported by Hewitt Rubber Corp., Buffalo. The synthetic consists of a chemical combination of butadiene and styrene, and is the general purpose rubber for which the government is building plants to produce.

FLAME JIG SAW SPLITS 33-FOOT CHANNELS

CUTS made by these two oxyacetylene cutting machines designed by The Linde Air Products Co., New York, are such that steel is saved in splitting 33-foot U-shaped channels, at the same time maintaining necessary strength required by stiffeners for structural use. The 33-foot channels are loaded two at a time on a special jig. The two cutting machines ride a track in the center of the jig. Each of their blowpipes is mounted on a floating mechanism, bottom of which rides along a templet, thus automatically producing the zig-zag line of cut in the base of the channel. The machines, splitting two channels simultaneously, travel at a constant speed of 16 inches per minute.



STEAM GENERATION
With Available Fuels

Characteristics of the available fuel, as outlined in the first installment, narrow the selection of equipment. However, many other factors are of assistance in designing a well-balanced steam generating unit. Some of these are outlined here

By OTTO de LORENZI
Assistant General Sales Manager
Combustion Engineering Co. Inc.
New York

(Concluded from last Week's Issue)

Pulverized Coal: With this type of firing all of the fuel is burned in suspension. The combustion process is similar to that occurring with liquid or gaseous fuels. However the factors of time, temperature and turbulence are different. With both gaseous and liquid fuels it is possible to quickly and intimately mix them with the air required for combustion and thus promote rapid burning. As a result relatively small furnace volume, resulting in high rates of heat liberation, are used. The fixed carbon in coal, on the other hand, is both hard to ignite and slow to burn. This characteristic thus makes necessary more time for burning, higher temperature for ignition and more turbulence to assist in speeding the combustion reactions. Larger furnace volumes provide the necessary time element. Fine grinding and proper relation between rate of fuel injection and rate of flame propogation will provide stability of ignition. Increased turbulence, due to the mixing action of high-speed streams of fuel and air, will produce a high temperature zone near the burners. This insures prompt ignition and rapid combustion of the fixed carbon. The permissible furnace liberation rates with pulverized coal will vary from 12,000 to 35,000 B.t.u. per cubic foot—a seemingly wide range.

The actual allowable rate is determined by the combustion of a number of factors. Furnace width, depth and height are most important. The ratio of refractory to water wall areas influences furnace temperatures and thus suitability of fuels and burner types. Duration and extent of peak demand over continuous load has considerable weight in arriving at required furnace volume. With pulverized coal firing the ash pit refuse may be in two forms, either dry dust or slag particles. The dust results from the use of so-called "dry bottom" furnace design, the slag from either intermittent or continuous slag tap design. In the case of the conversion job it is usually less costly to provide the "dry bottom" construction. The dry dust, however, is difficult to handle. In installations where the choice between stokers and pulverized coal is narrow, the final selection may be decided frequently by the ease of ash disposal.

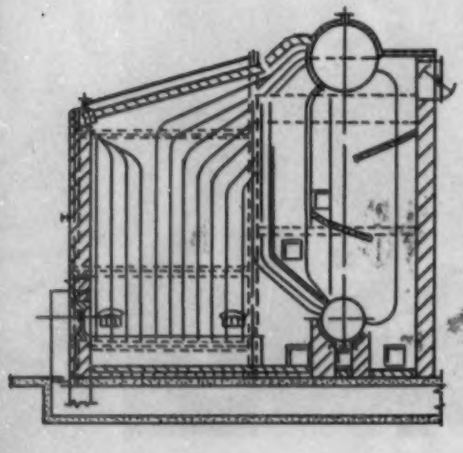
Underfeed Stokers: Included in this classification are the single and multiple retort stokers. The basic design feature which these have in common is that the coal is underfed to the grate surface through longitudinal retorts. Single retort stokers are limited to the smaller and intermediate units. Multiple retorts, on the other hand, are flexible as to size and, therefore, applicable from the intermediate to the larger units.

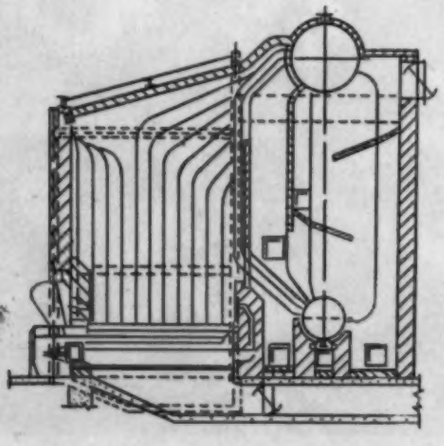
With the single retort stoker, since the furnaces are relatively small, continuous liberation rates may be as high as 55,000 B.t.u. per cubic foot. The ratio of dump to active area in this design is high. Judgment, therefore, must be exercised in selecting stoker size so as to provide a reasonable burning rate. The distance between fuel bed and nearest boiler surface must be great enough to prevent possible flame inpingement. Particularly advantageous characteristics of these stokers are: that only shallow ash pits at boiler room floor level are required; that all necessary operation can be carried out from stoker front thus requiring no side access; simplicity of design making rapid installation possible.

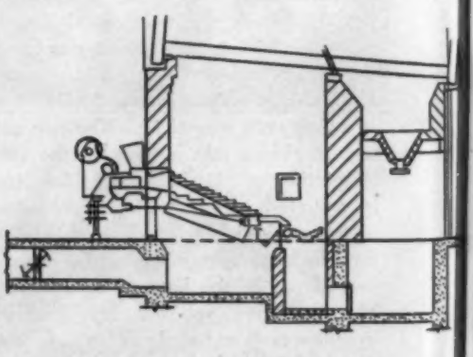
The multiple retort stoker is used on the larger installations. Since the furnaces generally are large, it is advisable to limit the continuous combustion rates to values below 35,000 B.t.u. per cubic foot and peaks below 50,000 B.t.u. In this design the ratio of dump to active grate surface is relatively low. As a result permissible combustion rates are somewhat higher than with single retort stokers. However, a complete

Fig. 1. (Left)—Original oil-fired boiler at left. Right, same boiler equipped with single retort stoker

Fig. 2. (Right)—Header-type boiler originally oil fired but now operated with underfeed stoker of multiple retort type







Guide

FOR MORTARS AND PLASTICS

TYPE OF WORK	MORTAR OR PLASTIC	TEMP. USE LIMIT, F.
Laying up dense firebrick		
with a high bond	B&W Air-Set Mortar	3025
with an air seal and cushion joint	B&W High-Temperature Mortar	3150
Laying up insulating firebrick with a heat-setting bond	B&W K-20 Clay	2000
	B&W IFB Mortar	3000
Laying up insulating firebrick with an air-setting bond	B&W Smoothset Mortar	2800
	B&W Air-Set Mortar	3025
Coating the face of dense firebrick	B&W High-Temperature Mortar	3150
	B&W Air-Set Mortar	3025
Coating the face of insulating firebrick	B&W IFB Mortar	3000
	B&W Chrome Mortar	3100
	B&W Green Refractory Paint	—
Laying up and coating firebrick to resist slag	B&W Chrome Mortar	3100
Shallow patching	B&W Air-Set Mortar	3025
Deep patching	B&W Plastic Moldable	3000
Pouring new baffles; casting special shapes; lining doors, car tops, etc.	B&W Baffle Mix (Type A)	2600
Ramming new baffles, repairing oil baffles, etc.	B&W Baffle Mix (Type B)	2600
Molding special shapes, capping walls, forming burner openings, forming small door openings, lining inspection and access doors in high-temperature zones, etc.	B&W Plastic Moldable	3000
Hearths and furnace bottoms, stud tube boiler walls, corbels, etc., where resistance to slag and abrasion is required	B&W Plastic Chrome Ore	3250
Cast or rammed insulating shapes and panels; lining flues and ducts; lining access, explosion, inspection and lance doors; steel stacks; insulating furnace hearths and car tops	B&W K-20 Concrete Mix	2000
	B&W K-22 Concrete Mix	2200

This chart is designed to simplify the usually complex problem of selecting the correct refractory materials for a wide range of uses. It is a condensation of the experience of one of the leading manufacturers of refractory mortars, plastics and castables. Copies suitable for filing or wall mounting will be gladly supplied on request.

THE BABCOCK & WILCOX COMPANY
Refractories Division, 85 Liberty Street, New York, N. Y.

BABCOCK & WILCOX

R-158

understanding of the fuel as well as load characteristics are necessary to provide a properly proportioned machine. Ash pits of reasonable size are an essential to satisfactory operation.

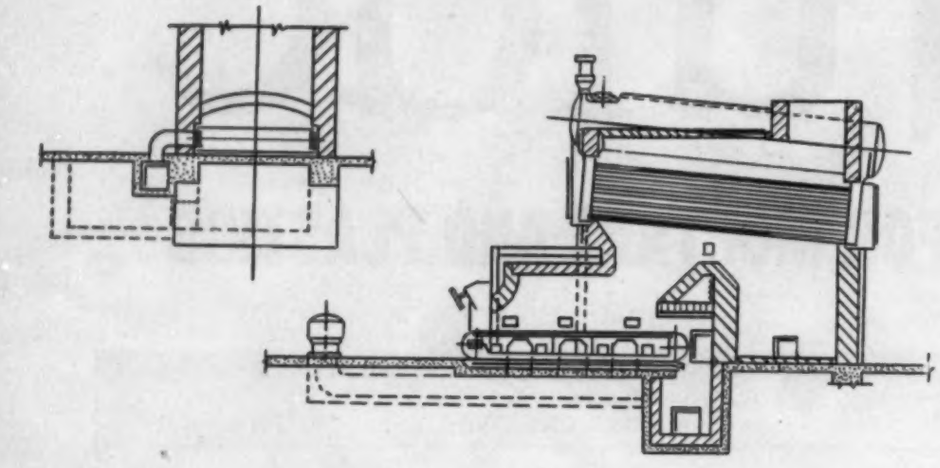
In the operation of both single and multiple retort stokers there is always a certain amount of so-called "fly ash" carried by the gases passing through the unit. The application of any form of cinder recovery system is not economical because the fuel loss from this source, with reasonable burning rates, is low. The majority of these particles, because they are relatively large in size, are trapped in the boiler. Those remaining, and discharged with the stack gases, fall in the immediate vicinity of the plant.

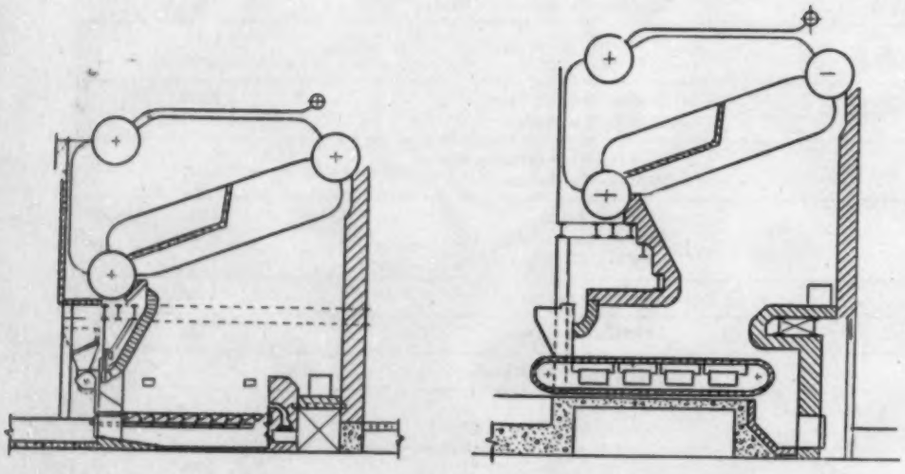
Traveling Grate Stokers: These stokers provide a continuously moving, nonagitating, type of grate surface. The coal is supplied to the furnace in a level uniformly thin bed and the refuse is discharged automatically to the ash pits. Anthracite, coke breeze, lignite and free burning bituminous coals are ideal traveling grate fuels. The furnaces with these stokers have arches to insure prompt ignition of the fuel, to stimulate turbulence and to provide uniform mixing of the combustion gases. The use of arches and the resulting turbulence makes possible higher liberation rates than with other stoker types. The boiler setting height, regardless of stoker, is practically the same and the arches simply reduce the available furnace volume in proportion to the permissible increase in liberation. The fuel burning rate will vary with its sizing and ignition characteristics. For No. 4 Anthracite Buck the continuous rate is approximately 25 pounds and for lignite may be as high as 65 pounds per square foot.

Spreader Stokers: The spreader stoker uses the combined principals of suspension burning and the nonagitated type of fuel bed. The relative coal sizing will govern the amount of burning carried out by each method. Because only a part of the combustion process occurs in the stationary fuel bed, it is necessary to provide liberal furnace volumes. Many of the earlier spreader installations had small furnaces and the results were far from satisfactory. The newer ones are now designed so that the available volume is larger than for underfeed stokers, yet smaller than with pulverized coal firing. For continuous operation the liberation should be preferably kept below 40,000 B.t.u. with a maximum of 60,000 for peaks of short duration. The spreader is perhaps the closest approach to a universal stoker. All of the coals from semianthracite to lignite are handled with facility. Anthracite also has been burned but its size-consist usually is confined to a narrow band making uniform distribution uncertain and difficult to maintain.

The "fly ash" carry-over, with spreader firing, is a function of the burning and liberation rate and also of the relative coal sizing. Properly designed boiler settings will provide traps for collecting a large portion of the carry-over. If cinder return system is then installed it is possible to reinject this otherwise

(*Please turn to Page* 90)





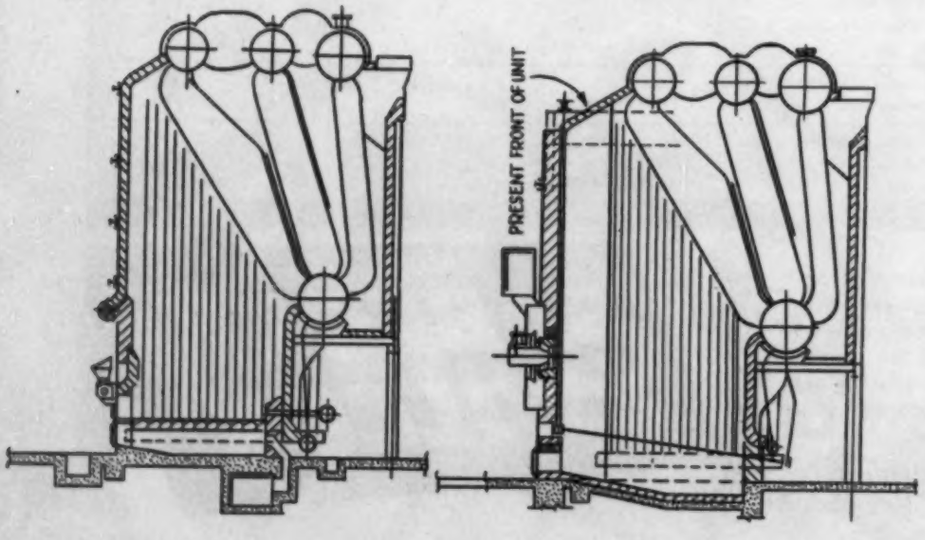


Fig. 3. (Left, above)—Front elevation, left, of dutch oven construction. Right, boiler now coal fired by traveling grate stoker

Fig. 4. (Center)—Original oil-fired boiler shown at left. Right, same boiler equipped with spreader-type stoker

Fig. 5. (Bottom)—Oil-fired boiler installation at right. Left, same boiler modified for spreader stoker application

When you turn in your scrap *this month*, your obligation does not end. For the steel furnaces must run next month, too -- and the next -- and the next.

Steel production of eighty-five to ninety million tons of ingots a year calls for approximately 3,000,000 tons of scrap per month--about 750,000 tons a week--over 100,000 tons a day. Half of this comes from the industry itself, but the other half must come from the public.

Reduced to its simplest terms, if the steel industry is to produce steel at the rate and in the volume that our war program demands, then America must collect nearly ONE POUND OF SCRAP EVERY DAY for each man, woman and child in the nation.

You, the reader of this publication, have this clear, individual obligation: As a patriotic citizen and a responsible executive or workman, you must act to the extent of your ability to KEEP SCRAP FLOWING to the steel plants.

Do your part to enlist scrap for the duration.

WHY NOT TRY THIS YOUNGSTOWN IDEA?

Red-white-and-blue barrels like this stand on important street corners, in both business and residential districts of Youngstown, Ohio. They provide a convenient and tangible means of getting action from citizens, young and old, who are bombarded daily with radio, newspaper, magazine and other advertising urging them to turn in scrap.

That this is an effective idea is proven by the fact that two city trucks are kept busy every day, collecting scrap from these barrels and answering calls from householders who have other scrap to contribute, too large to go into the barrels. Perhaps YOUR city can try this plan, too.

This Company joins in the counter attack against accidents by subscribing to the National Safety Council's War Production Fund to Conserve Manpower.

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN, OHIO

CHIP-HANDLING

By MARK E. NEVILS
Wright Aeronautical Corp.
New York

. . . . segregates various types of steel as well as aluminum, magnesium, brass and bronze; collects enough scrap metal in a year to build a destroyer flotilla

WITH conservation of every ounce of metal chips and shavings such an essential part of our war economy, the recent development of a fast chip-handling system that quickly turns such vital metals into the stream of war production is important.

Now engaged in mass production of powerful Cyclone engines for numerous United States warplanes, this midwest factory operates acre after acre of floor space containing thousands of busy, high-output machine tools which throw off many tons of steel, aluminum, brass and bronze chips 24 hours each day. Since 60 to 80 per cent of the material in rough forgings and parts must be removed in the machining process to produce the strong, precision-built parts

Fig. 1—Coming from the discharge chute of the crusher in the rear, chips are loaded into containers resting on a short section of roller conveyor. This enables loaded containers to be pushed out from under the crusher where an overhead hoist picks them up and loads them into the centrifuge, foreground

Fig. 2—Trailer cars are discharged by tilting sidewise into a chute which feeds the turnings into a powerful crusher. There they are broken up into small chips

SYSTEM

required for an aircraft engine, the huge amount of scrap metal collected every hour is sufficient in the period of a year to build an entire flotilla of destroyers.

Under the new chip-handling system, all shavings, turnings, borings, chips and other excess metal are removed without interfering with production. In less than 40 minutes a miniature haystack of long, curly shavings can be picked up from a machine in a special metal container, dumped into a conveyor train, crushed, freed of machining oil and completely packed away in a railway gondola car half a mile from the factory.

The chip-handling system also segregates each metal at the source, thus avoiding complicated separation processes; it handles the chips with negligible loss, saves a tremendous number of man-hours when manpower is difficult to obtain and conserves already over-

Fig. 3—First step in chip-handling system is to rake turnings and borings from the machine tool into a chip box which will be unloaded by a lift truck

Fig. 4—Side-dump trailer cars are attached to an industrial tractor to form a train, as shown here, for towing to the chip house

Fig. 5—Crushed and cleaned chips travel to a series of overhead bins where scrap is accumulated into carload lots. All the way through the chip-handling system different metals are carefully segregated, beginning at the machine tool and ending up in separate storage bins. Bin contents then are poured in gondola cars

For faster, uninterrupted

. . . equip your Wilson Hornet with a Stroco Crater Eliminator

Your Wilson Hornet Arc Welding Machine permits faster welding speeds — it has the quickest recovery, the hottest arc, the best welding characteristics.

When heavy metals are to be worked, even greater speeds are possible by adding a Stroco Crater Eliminator. This time-saving attachment — by gradually fading the arc instead of ending it abruptly — prevents harmful craters, eliminates weakening defects which necessitate time consuming chipping, saves valuable electrodes badly needed for war production.

The Stroco Crater Eliminator is ideal for working on heavy metal and can also be used on light gauge material. It can be easily installed by the purchaser. Write Wilson for descriptive Bulletin ADW-41.

WILSON WELDER AND METALS

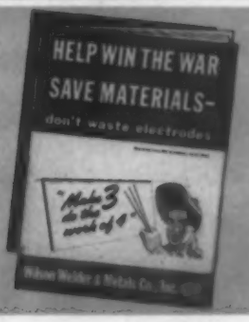
General Offices: 60 East 42nd Street, New York, N. Y.

d heavy production welding

CO., INC.

CONSERVE WELDING ELECTRODES

Write for free copies of this helpful booklet. It contains six shop bulletins emphasizing important ways to prevent electrode waste.



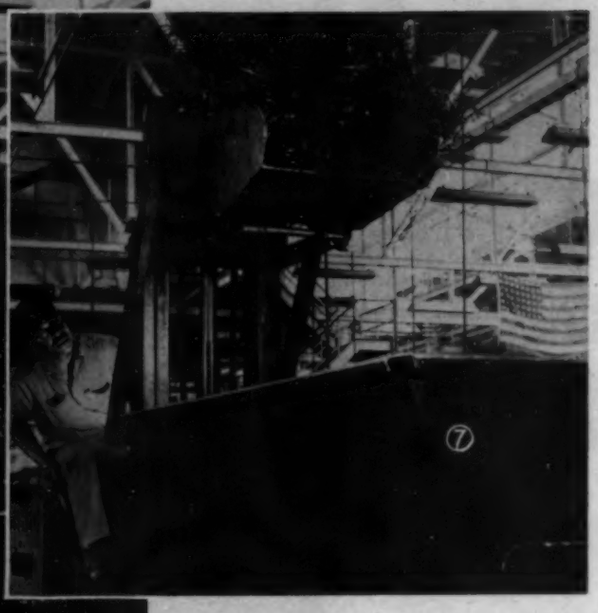


Fig. 6—Second step involves use of an industrial power truck which picks up the chip box and carries it to a nearby gondola carrying similar scrap. Metals are carefully segregated beginning at the machine tool. Scrap handling system salvages steel, aluminum, magnesium, brass and bronze

Fig. 7—Chip box is emptied into side-dump trailer car at next point on its way back to the steel mill

taxed shipping space by reducing the voluminous shavings to small chips, their most compact form.

A metal box resembling a huge sugar scoop but holding about 4 bushels of shavings receives the excess metal at the discharge point of any type of machine tool. These chip boxes are picked up by small lift trucks which move up and down the broad aisles of the factory, and are then lifted and dumped automatically into light, narrow, side-dump trailer cars having a capacity of 35 cubic feet.

When a train of 10 to 15 heaping gondolas is collected on a roadway outside the plant, it is towed to the chip processing plant by a shuttle service powered by gasoline industrial tractors. Here the side-dump gondolas toss their cargoes of metal into drain pans where a portion of the machining oil still clinging to the chips, drains off.

Then the bunches of chips or shavings are pulled apart enough to be stuffed into a hammer mill crusher which cuts them into small pieces that can be handled easily and also shipped in a minimum of space. Chips which have been cut with oil coolants come from the crusher in a conveyor which dumps them in a standard industrial centrifuge.

Whirled at 780 revolution per minute, these chips lose the last traces of oil which spin off to drain and be reclaimed. The oil-free chips drop into another belt conveyor which hoists them into a 100-ton storage hopper, 40 feet over a spur track on which railroad gondola cars await loading. The mouth of an oversize chute is opened and a metal flood of 25 tons pours into the railroad gondola, ready for shipment to a processing plant and utilization again in the war effort.

New Coating Resin Has Greater Adhesion

Plastics Division of Carbide & Carbon Chemicals Corp., Unit of Union Carbide Corp., New York, announces a new and improved vinyl resin for corrosion-resistant maintenance finishes and other coating applications. Identified as Vinylite resin, it is reported to have a remarkably improved adhesion to a wide variety of surfaces.

The new resin is quite similar to the vinyl chloride-acetate resins in most of its properties and different only in containing a small amount of an additional ingredient that promotes the development of adhesion. It is suitable for maintenance work, for coating industrial equipment exposed to very corrosive atmospheres and lining storage tanks to hold petroleum products, acids, alkalies, or other corrosive materials.

Tests, according to the company, show excellent performance on salt water immersion.

Develops Synthetic Resurfacing Compound

Lev-L-Flor, a synthetic repair and resurfacing compound recently developed by Central Paint & Varnish Works, Brooklyn, N. Y., can be used to either repair or resurface wood or concrete floors. When used on a wood floor it is said to transform it into a fire and waterproof surface.

According to the company, the product has a higher compressive strength and will not crack or break out like rigid compounds. It is being offered ready to use and can be applied without chipping out the old surface. It is ready for service in several hours.

Have you the N.E. blues?

The high manganese content of the new National Emergency steels is posing new cutting oil problems almost every day. But tough as these new steels may be, there's a Shell Lata Oil to do the job . . . fast and well.

Shell Lata Oils are delivered to you ready for instant use. This eliminates any chance of a mistake in blending at the factory . . . insures uniformity at all times.

And because every cutting oil job *is* different, Shell has developed a control technique that "balances" the oil for each particular job . . . fits the oil to the machine, the application and the tool.

Call in the Shell man now. Let him show you how this technique can cut machine down-time, improve surface finish, increase tool life in YOUR plant.

OIL IS Ammunition -USE IT WISELY

SHELL LATA OILS *for Cutting*

SHELL

Steam Generation

(*Continued from Page 82*)

wasted fuel into the furnace. The flue gases, leaving the boiler, will carry the unrecovered portion of the fly ash and deposit it in the plant vicinity. These deposits may constitute a considerable fuel loss and also are a nuisance. Consideration, therefore, must always be given to the use of a dust collector. This possibility is ever present and is one of the factors that carries great weight in the selection of stoker types to use. Regardless of this apparent fault the spreader stoker has the widest range of application. The first cost is modest and economically justified in most instances. It has a wide range of flexibility and is well suited to automatic control. The application, to existing boilers, can be made quickly with a minimum amount of setting changes. The spreader stoker must receive most serious consideration in all cases where conversion to coal is necessary.

Accompanying illustrations are used to show some of the problems encountered in adapting existing installations to a change in fuel. For the sake of brevity no attempt will be made to bring out all of the engineering details or the economic studies involved in making the final equipment selection. The examples are varied and include the use of both stokers and pulverized coal.

The unit shown in Fig. 1 is installed in a well-known Connecticut industrial plant. It was originally oil fired and operated at a continuous capacity of approximately 35,000 pounds per hour. The alternate fuel available in this vicinity is a good grade of eastern bituminous coal, well suited to either stoker or pulverized fuel firing. The plant is located in a populous area and consequently any possible dust nuisance should be avoided. This immediately ruled out spreader stokers or pulverizers unless dust collectors were used. It was essential to install the new equipment in the shortest possible time avoiding any decrease in production. The single retort stoker was therefore selected and, as shown in Fig. 1, the setting changes were minimized. Oil burners were removed and the upper portion of the frontwall supported on a newly installed steel member. A second bridgewall was placed in front of the one originally installed. The first boiler baffle was revised and now extends vertically upward from the bridgewall. Existing foundations were modified to provide shallow ash pits on either side of the existing air duct. These foundation changes were made over a week-end and the unit then put into service equipment the boiler was again shut down over a week-end. It was ready for service with coal on the following Monday morning. Units, of the type illustrated, are perhaps the easiest ones on which to apply almost any design of fuel burning equipment.

The header type boiler, shown in Fig. 2, is installed in a Maryland plant and operated at a capacity of 62,000 pounds per hour. It was originally oil fired. The furnace occupied the entire space below the boiler tubes. Because of low setting height the available furnace volume is relatively small. As a result pulverized coal firing was immediately ruled out. Spreader stokers were next considered. Due to the absence of wall cooling, the short distance from feeder to boiler tubes, and also rather limited furnace volume, possible operating difficulties were anticipated. Chain grates were out of the picture as coking and caking coals are the only ones readily available to the plant. The choice of equipment is therefore narrowed down to the underfeed stoker of the multiple retort type because the single retort is too small for the output required. Shallow ash pits with an access trench below the existing floor were provided to minimize excavation. The horizontal boiler baffle was removed and the vertical one extended to meet the top of a newly installed bridgewall. The rear of the boiler was changed to an undercut construction, thus eliminating most of the old rear wall. All of these changes required time and were somewhat costly, but made possible satisfactory operation.

The boiler shown in Fig. 3 is located in an area where anthracite is the only coal economically available. As a result the stoker must be of the traveling grate type. The original oil-fired furnace occupied the entire area under the boiler and terminated at floor level. To apply the stoker it was necessary to replace the frontwall with a dutch oven construction and thus provide the arches required. The boiler baffling was unchanged. An intermediate bridgewall was installed and directly in front of this is a newly excavated trench extending under and beyond one sidewall. This trench forms the ash pit at the rear of the stoker and also the access means for side removal of the accumulated refuse. This represents perhaps the minimum possible changes required for applications of this stoker type.

Under normal conditions it is almost always possible to justify an installation of equipment designed to use the available low-cost fuel. However, where it is necessary to effect conversion of an existing unit, it may prove to be more economical to use the higher cost fuel. The unit shown in Fig. 4 is an excellent example of the foregoing. This boiler is located in an area where anthracite is the normal low-cost coal. It has a furnace width of 19 feet, is set 10 feet from floor to center line of mud drum, and has a capacity of 65,000 pounds per hour. The top of a thick concrete mat supported on piling is just 2 feet below the operating floor. If anthracite is the selected fuel then it becomes necessary to reset the boiler with a minimum setting height of 16 feet. This in itself is a costly operation. In addition complicated foundations and furnace construction mean further increased costs. These can hardly be justified when compared with the simplicity and low cost of applying a spreader stoker. With this alternate equipment the original boiler setting height remains unchanged. A stub bridgewall is built in front of the rear furnace wall. The top of the concrete mat, covered with suitable insulating material and refractories, serves as the bottom of the ash pit. Adequate furnace volume thus

(*Please turn to Page 107*)

CHRYSLER WATER TRACTOR

LARGE STEEL barges with full deck loads can be propelled by this marine propulsion unit recently designed by Chrysler Corp. The pontoon tractor can be attached or detached easily from any cargo carrier. Once in place, it becomes an integral part of the carrier, as rigid as the general hull structure. Barges can be moved as quickly as if pulled by an ordinary tug, and with the maneuverability of an independent vessel. The tractor is particularly adaptable for river work, inland seas, or any reasonable smooth body of water

We're 100% for making the Axis see stars!

VAN DORN IS IN FULL PRODUCTION ON ARMOR FOR TANKS • BOMBERS • FIGHTERS AND GUNS

Before Victory can be won, Americans must attack with crushing blows on all fighting fronts. If we don't have the weapons needed to do it now, we must build them in a hurry.

Production at the Van Dorn plant is 100% on equipping Allied forces for full-out attacks. We're producing tank armor at top speed to start more rolling fortresses pounding at enemy lines. We're rushing out aircraft armor that helps our pilots through to deliver their "knockout drops." We're going full steam building armored shields that keep our gun crews blazing away.

Van Dorn workers are proud to share in the vital war assignment of building armor to protect our fighting men in combat. And we're working 24 hours a day to see that our part of this important job is well done.

THE VAN DORN IRON WORKS COMPANY
CLEVELAND, OHIO

DESIGNERS AND BUILDERS OF PRISON EQUIPMENT SINCE 1878

QUALITY CONTROL

. . . . in the manufacture of permanent magnets cuts rejects 90 per cent

AMERICAN industry has been given credit for the invention of the system of mass production. The present need for mass production of such a tremendous number of products for the war effort has thrown a heavy burden on the manufacturing facilities of the country.

Mass production is fundamentally based on careful control of the dimensions and the processes that together make uniform parts for the final product. Within the last few years much attention has been given to the general subject of a statistical control as applied to manufacturing processes.

It is the purpose here to discuss one example of the application of the fundamentals of statistical control to an actual manufacturing process to accomplish an increase in production and a decrease in the number of rejected units.

Several excellent reference books have been published to cover the mathematical approach to this general problem. While it has been helpful to use some of the more complex forms of analysis at certain stages in the example that will be shown, the approach to it has been largely that of using the basic concepts which are readily understood by the man in the shop rather than to confuse the basic fundamentals of quality control by dressing them in mathematical guise.

The manufacture of a permanent magnet has been chosen as the example to be presented. While thousands of similar magnets are being produced for aircraft instruments and electrical instruments for war purposes, it seems prudent to choose for this example a magnet used for domestic and commercial watt-hour meters. The same general process of manufacture applies and the same basic problems of statistical control are involved.

Fig. 1 shows a watt-hour meter damping magnet consisting of a soft iron yoke which forms the outside frame and two small columns of a permanent magnet material, in this case Alnico II. (1) The magnets, when magnetized, concentrate the useful flux across the narrow gap between the top of these pieces of Alnico and the yoke of cold-rolled steel. A disk of aluminum or copper running in this gap experiences a retarding torque which is proportional to the velocity of the disk.

It is essential that a magnet of this kind have uniform magnetic properties and that the magnet have high magnetic strength. It is easy to reduce the flux of the magnet to any desired level, but this is, of course, possible only if the

Fig. 1—The cast Alnico permanent magnets are in the lower center portion of this watt-hour meter retarding magnet. A soft iron yoke forms outer frame

Fig. 2—The method of recording sampling results shown here works well

Fig. 3—Record sheet obtained for the period after establishment of process control

ALNICO MAGNET SATURATED STRENGTH RECORD

SAMPLES - 1 IN ..... DATE 8/15/40 TO 8/22/40

	400	500	600	700	800
0					
10					
20					
30					
40					
50					
60					
70					
80					
90					

TOTAL NUMBER = 774

AVERAGE VALUE = 622

% 710 OR OVER = 3.5

②

SAMPLES - 1 IN ..... DATE 1/30/42 TO 2/6/42.

	600	700	800
0			
10			
20			
30			
40			
50			
60			
70			
80			
90			

TOTAL NUMBER = 677

AVERAGE VALUE = $\frac{496660}{677}$ = 734

% 710 OR OVER = $\frac{529}{677}$ = 78.1

③

By J. H. GOSS
Engineer
Works Laboratory
General Electric Co.
Schenectady, N. Y.

magnets produced run above the desired level initially.

The manufacturing steps in the production of this magnet as shown in Fig. 4 are briefly as follows:

The permanent magnet material, the Alnico II, is cast integral with the bottom section of the cold-rolled steel yoke, and then the tops of the pieces of the magnet material are surface ground and the top of the yoke assembly is welded to the bottom yoke. Following the welding of the yoke assembly, the magnet is given stabilizing treatments to develop permancy of magnetic properties. It is then given a suitable finish, and finally is magnetized, measured and adjusted to the desired strength.

It is finished to give corrosion protection and to provide improved appearance. In case the strength is above that desired, a demagnetizing force is applied, usually with an alternating current demagnetizing field, which reduces it to the desired value.

Extremely careful control of the casting processes is necessary in order to obtain good magnetic properties of the permanent magnet material. (1) These magnets are made by the hundreds of thousands in periods of normal production and inasmuch as the process requires several days, it is important that the quality of the magnetic material be determined as soon after the casting process as possible.

A test was therefore devised to measure the magnetic strength of the permanent magnet within ten minutes after the units are cast. The various melts are held after casting until samples were measured and the individual melts are then released for further processing.

Some difficulty was encountered at the start of production due to the fact that the personnel measuring the magnets and releasing the melts was not the same as the personnel responsible for the casting of the magnets. This led to the melter's putting emphasis on the mechanical quality of the casting and not giving as much attention to the magnetic quality.

An excellent solution was found for this difficulty—posting the chart shown in Fig. 8 in a conspicuous place in the area where casting was done. This chart concentrated attention on the magnetic quality by showing the results from the sample magnets. The lower limit of magnetic strength that could be successfully processed was indicated on the chart as the low limit and a bogey average was posted which represented really good performance.

Immediately after this chart was posted an improvement was noticed and a great deal of interest was shown by the melters in keeping their magnetic strength up to the bogey average and well above the lower limit. The use of this chart

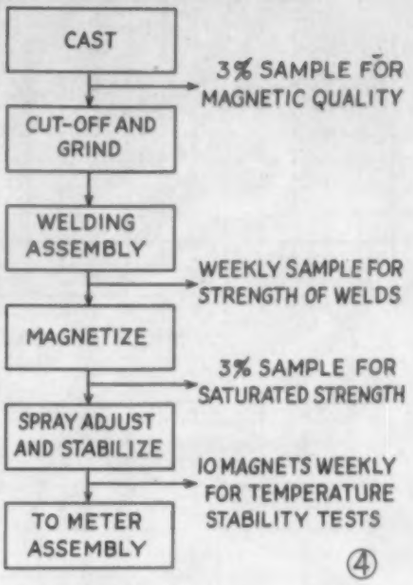


Fig. 4—Manufacturing steps followed in production of the unit shown in Fig. 1

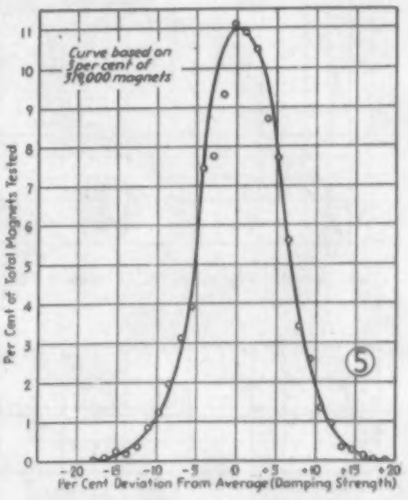
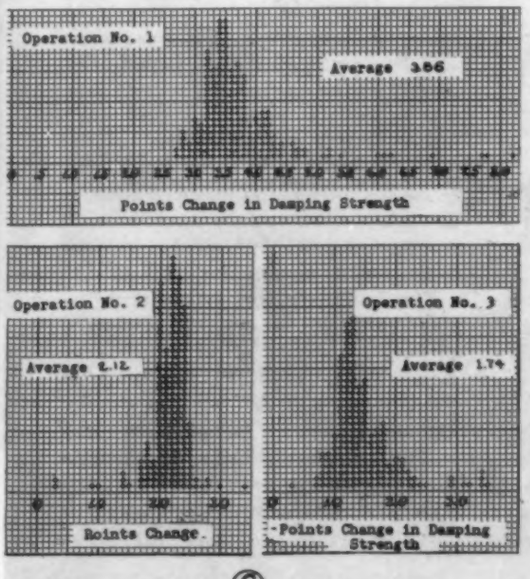
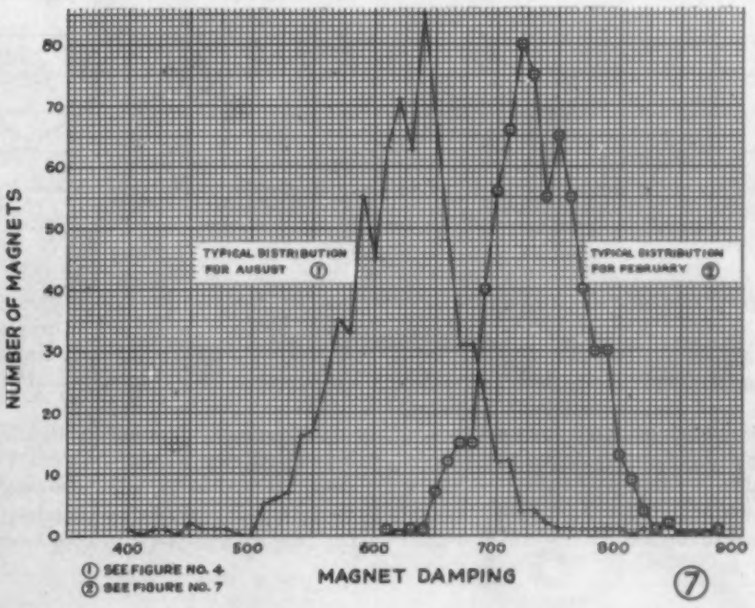

Curve based on 3 per cent of 30,000 magnets
Per Cent of Total Magnets Tested
Per Cent Deviation From Average (Damping Strength)
⑤

Fig. 5—Improved magnetic strength distribution curve

Fig. 6—Study of change in magnet damping resulting from processing operations

Fig. 7—Curve shown by crosses reveals typical distribution before process control was established. Curve connecting circles was made after process control. Note improvement





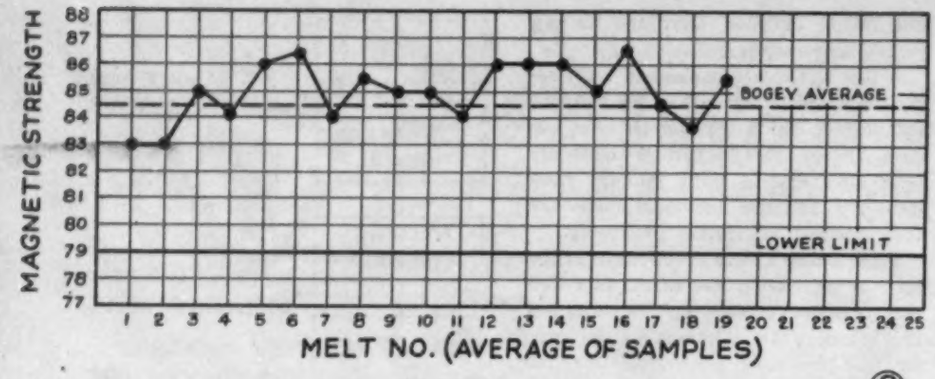


Fig. 8—This is the chart which helped keep magnetic strength up

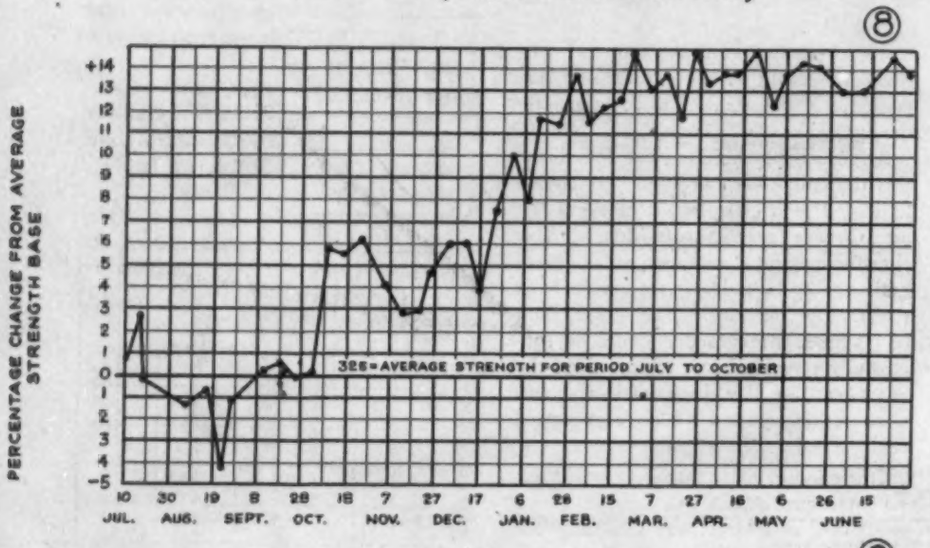


Fig. 9—Chronological record showing average magnet damping strength increase with establishment of process control in the foundry

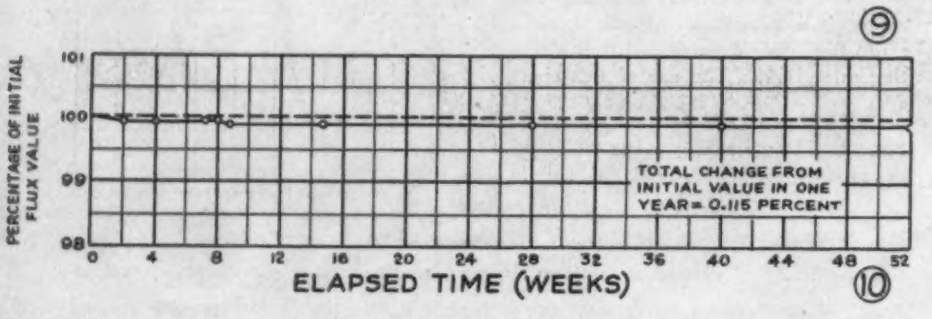


Fig. 10—Room temperature aging of stabilized Alnico watthour meter damping magnet

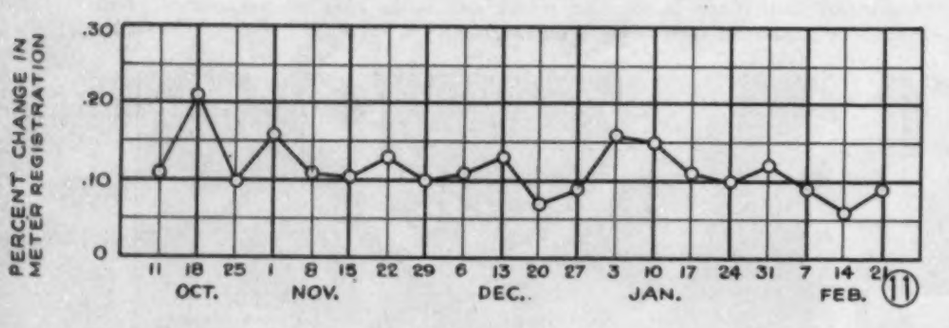


Fig. 11—Temperature stability curve on magnets subjected three cycles in temperature from minus 40 to plus 75 degrees Cent.

has covered a period of over two years and has been of much value in accomplishing control at this point.

Fig. 2 shows a convenient form for recording magnetic strength readings on completed magnets. It should be noted that the damping strength is proportional to the square of the square of the magnet flux. Therefore, the variation magnet strength is but one-half the variation in damping strength. The chart shown in Fig. 4 was filled in before the control of magnetic strength was fully accomplished in the foundry and shows a poor distribution.

The magnets are normally handled in trays containing 30 magnets, and it was found convenient to collect the readings by having the production operators take one magnet from each tray as a sample and set it aside for measurement. At regular intervals a special operation was made of checking these magnets for their saturated strength and recording the readings on the chart as shown in Fig. 2.

Slight losses in strength occur at various points in the process and in making up Fig. 8 to establish the low limit permissible, it was necessary to make allowances for these losses. Fig. 6 shows a work sheet used in accumulating data at the various points of the process to see what allowance should be made.

Distribution Spread Important

It is obvious that in making the proper allowance for each step in the process, averages are not the only thing one is concerned with, but minimum and distribution spread are important and must be taken into account. By actually plotting out the distribution curve, a very understandable picture is obtained that can be discussed with the men in the shop and readily understood.

Fig. 7 shows actual plotted distributions from the record sheets such as Fig. 2 for the period of one month in which the foundry control was not in operation and a period of one month after the foundry control was in operation. The former curve shows a much poorer performance than the latter, and it is evident that a real improvement has been accomplished. Fig. 3 shows the actual record sheet for the period after control was established. It is interesting to compare this with the record sheet before control was established.

In order to present a running picture of the improvement in magnetic strength as a result of the foundry control, Fig. 9 was plotted to show the average strength of the magnet as a function of time.

Fig. 5 shows a very symmetrical distribution curve that was obtained from plotting the results of the 3 per cent sample of a group of 319,000 magnets in the latter part of the period shown by Fig. 9.

It is not enough to produce a permament magnet for measurement purposes with good initial strength because such

(*Please turn to Page* 104)

An Army Travels on its Ammonium Sulfate

Did you think we were going to say "An army travels on its stomach?" Well, it's the same thing.

Many of the essential chemicals used by farmers in raising plants and animals are derived from coal.

One of the fundamental needs of the farm is nitrogen. It produces bigger yields and better qualities.

When the First World War started, the shortage of imported nitrogen made it difficult to get good fertilizers. Today, large supplies of nitrogen are obtained from ammonium sulfate recovered from the coal carbonized in Koppers coke ovens.

Koppers serves the farmer and the food industry in many other ways.

Fruits are often destroyed by diseases caused by fungi, or by dropping before ripe. Diseases of fruits are prevented by Koppers Flotation Sulfur. The premature dropping of unripe fruit is being prevented through the use of synthetic plant hormones made from naphthalene of which Koppers is a major producer.

Koppers built the first large American plant for recovery of ammonium thiocyanate, an essential raw material in the production of complex organic thiocyanates for insecticide manufacture.

Farmers control animal parasites with coal tar products . . . they get their products to market on roads built of coal tars . . . they prevent decay and destruction of wooden farm structures through the use of lumber pressure treated with Koppers creosote . . . they use Koppers American Hammered Piston Rings in many farm vehicles.—Koppers Co., Pittsburgh, Pa.

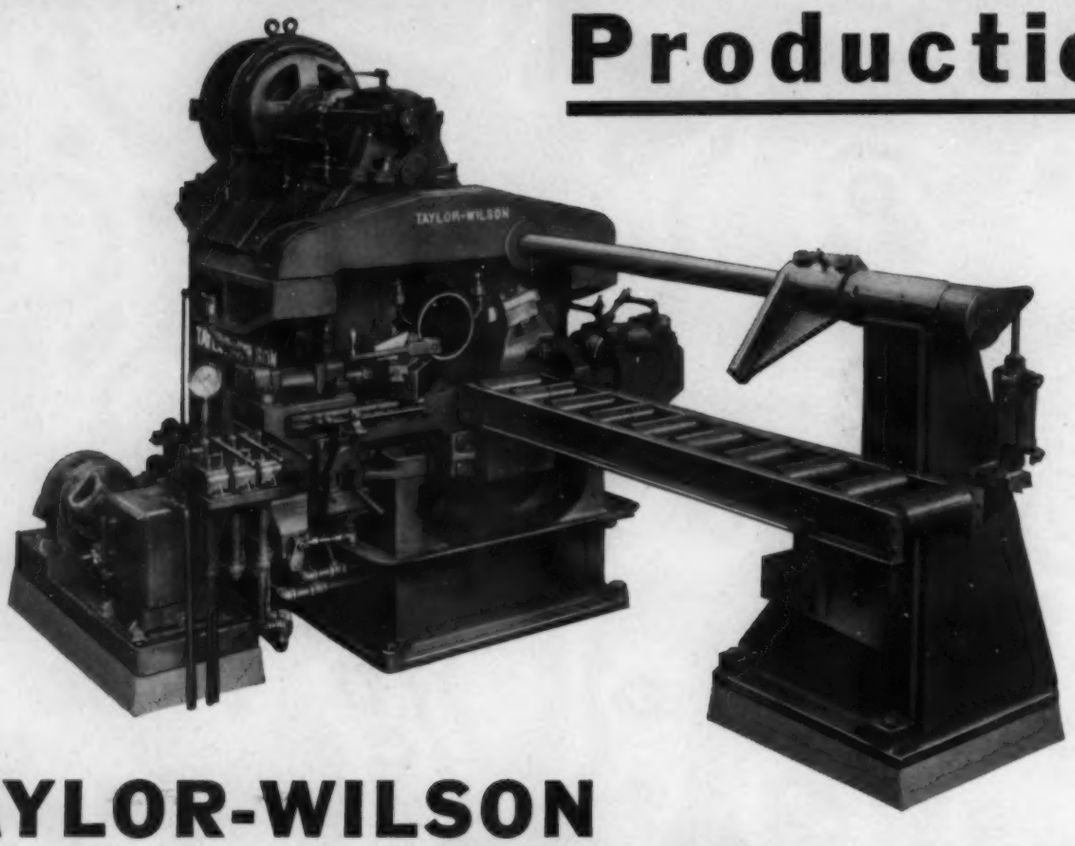
Buy United States
War Bonds and Stamps

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

Workers in our Bartlett Hayward Division are now privileged to wear the Navy "E" and Maritime "M" emblems.

Faster and More Accurate Production



TAYLOR-WILSON Cutting-Off Machine

In war plants throughout the country Taylor-Wilson Cutting-Off Machines are performing with speed and accuracy, making it possible to step up schedules of vital production for our fighting forces.

Taylor-Wilson Machines are sturdy, vibrationless, long lasting, and accurate at all speeds within the limitations of the cutting tools. Many of them in many plants are saving valuable time in cutting off pipe or tubing for Coupling Stock, Roller Bearing Blanks, Bomb Blanks and other vital production. Sizes 1" to 24" Diameters.

Write for Descriptive Literature

TAYLOR-WILSON MFG CO.

15 Thomson Ave., McKees Rocks, Pa.

PITTSBURGH DISTRICT

Surface Hardening

(*Continued from Page 65*)

General Motors plants playing a leading role in our war production efforts, attention is centered directly upon the importance of this advance in surface hardening practice.

Continuous Belt-Type Furnaces: Roller bearing parts, such as separators, end rings and spacing bars, are treated to file-turning surface hardness in a continuous woven-wire-belt muffle-type furnace without appreciable part distortion or surface tarnishing. The parts are loaded into an inclined muffle at the feed end of the furnace—to minimize air infiltration—and quickly brought to full heat. Parts then are immediately and uniformly cooled to about 1300 degrees Fahr. as they come from the heating chamber and are allowed to cool gradually to about 300 degrees in the muffle or cooling section. Both heating and cooling take place in a rich ammoniated carbon-gas atmosphere.

Parts then are dropped through a water-sealed chute into a discharge tank. To secure desired ductility of treated parts, the maximum temperature in initial heating is limited to about 1560 degrees Fahr.

Using a gas mixture of nine parts of ammonia gas to one part of natural gas propane—total gas flow of 82 cubic feet per hour—a case depth of 0.001 to 0.003-inch is secured in a 14-minute cycle, the depth depending upon the size of the part. Case depth is 0.003 to 0.005-inch for a 24-minute cycle; 0.008 to 0.012-inch for a 75-minute cycle.

Parts with perforations that in previously employed salt case-hardening methods had presented a difficult and time consuming cleansing problem are now ni-carbed free of any deposit blemish, avoiding even a simple washing operation.

Muffle-Type Tray Furnace: Tray-type ni-carb furnaces are employed for hardening bearing races and split rings of SAE 1060 steel and for processing rings of SAE 1015 steel. For these particular parts, a top work temperature of 1590 degrees Fahr. is established, and oil quenching is employed to secure maximum surface hardness. These furnaces are of gas-fired, continuous, mechanical-pusher operated, muffle-type variety with trays to carry the work.

The races and split rings are processed to required hardness and metal structure, while the ni-carb case overcomes any slight decarburization that may have existed in the raw stock. These parts then are used without any subsequent grinding. The gas mixture consists of 16 cubic feet of ammonia and 26 cubic feet of natural gas propane per hour. The processing cycle varies from 45 to 75 minutes, depending upon the size of the work.

The SAE 1015 rings, however, are ni-carbed to a minimum depth of 0.035-inch in a more ammoniated gas atmosphere—77 cubic feet of ammonia and 32 cubic feet of natural gas propane per hour. A 4-hour treatment cycle is required for this heavy case on the low-carbon steel.

Reciprocating Hearth Furnace: A reciprocating-hearth full muffle-type furnace is employed at several General Motors plants for hardening various alloy steel parts of SAE grades 1315, 1340, 3140 and 4615 such as is employed in bodies, sleeves, nuts, jaws, bevel gear wrenches and the like. The furnace muffle, 12 inches in width and about 6½ feet long, is suspended from hangers. A unique method of advancing the work through the muffle is employed here.

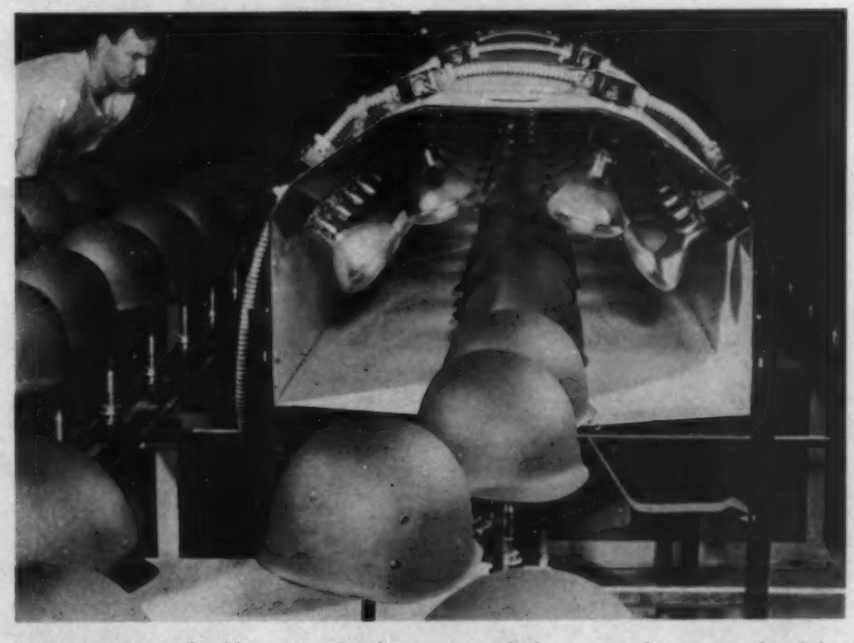
A motor-driven cam draws the swinging muffle back against spring pressure. On the drop of the cam, the spring propels the muffle forward rapidly until it strikes an anvil bumper and its forward motion abruptly stopped. Thus the load, or work, is advanced step by step under its own momentum. This type of unit is shown in Fig. 3.

The muffle, which has a capacity of up to 300 pounds of work per hour, is charged with a mixture of city gas and ammonia. To prevent air-dilution of the mixture, the work is fed to the muffle through a flame curtain and is discharged to an oil quench via a sealed and enclosed chute. The quenching tank extends under the heating furnace. As the hot work slides down the chute it is sprayed by a cascade of oil to insure dousing uniformity and to prevent splashing. A mesh belt conveyor carries the work through the quench tank and deposits the treated parts in a drainage basket—thoroughly clean and highly resistant to corrosion and oxidation.

In this particular application some of the work has been carburized, slowly cooled and machined before it is placed in the ni-carbing furnace, which is then utilized simply for skin effect produced, the superimposing of a light (0.006 to 0.008-inch) extremely hard, wear-resisting surface case. Otherwise another cyanidizing operation followed by a difficult and time consuming cleansing job would be necessary to produce the same result.

Bell Retort Furnaces: Probably the most flexible as well as the simplest furnace construction for ni-carbing ferrous metals is a vertical cylindrical unit with a removable latch-bottom bell-shaped retort having a top gas inlet through which the furnace atmosphere is charged. This

DRIES 500 ARMY HELMETS PER HOUR



FIVE HUNDRED freshly painted, plastic Army helmets per hour are dried by use of this Westinghouse setup of infrared lamps. Helmets are painted while on conveyors which pass through dryers like the above, at a speed of 12 feet per minute. To obtain even drying at 240 degrees Fahr., hats are rotated slowly on spindles as they move under the four rows of 250 watt, R-40 infrared lamps with built-in reflectors. These plastic units provide comfort and heat insulation when worn inside 2-pound steel helmets

treating gas mixture consists of carbon-gas and ammonia when ni-carbing, gas alone when carburizing, or straight ammonia when simply nitriding. This type of furnace is also suitable for brazing operations and for clean annealing in a suitable atmosphere.

The work is supported on removable fixtures, placed in baskets or simply piled on the base of the bell retort. After heat treatment, the work can be cooled down in the retort in the same treating atmosphere, or the bell retort with its attached base can be removed from the furnace with the work in position and placed in a cooling pit. This procedure is followed in the treatment of air-hardening die steels.

Quenching for case hardness without exposing the heated work to the outside atmosphere is effected by loading the work upon a vertical base plate and stem positioned in the retort bell. This supporting assemblage is dropped into the quench bath after the retort with the work in position has been transferred to the quench.

The load capacity of these furnaces is individually limited, the usual inside dimensions of the retort being either 4-inch diameter by 8-inch available depth or 10-inch diameter by 14 inches. However, the use of several bells permits individual batches of hot work to be removed for slow cooling or quenching of the charge while other bells are loaded and placed in the furnace section for the heating step. Such a multiplicity of bell-retorts thus enables fairly continuous heat treating to be maintained at a good rate of output.

TABLE I—Comparative Analyses of Typical Ni-Carb and Cyanide Cases

Surface Depth, Inch	Ni-Carb		Cyanide	
	Carbon %	Nitrogen %	Carbon %	Nitrogen %
0.004	0.53	1.41	0.75	0.83
0.008	0.47	0.33	0.56	0.43
0.012	0.30	0.07	0.30	0.11
0.016	0.19	0.06	0.20	0.04

M. H. Folkner, research metallurgist, Hyatt Bearings Division, General Motors Corp.

A load of small pump motor housings, Fig. 2, at one plant is surface hardened at a temperature of 1300 degrees Fahr. in a gas mixture running 10 cubic feet of city gas to 5 cubic feet of ammonia per hour for 45 minutes. Work then is removed undisturbed in one of these bell retorts to cool to room temperature in a current of city gas just sufficient to prevent the infiltration of air. So successfully is this hardening operation carried on that not only is there no work distortion but the necessary hair-line tolerances permitted are not modified in the least.

Of like concern is the hardening of the teeth of marking rolls 14 inches in diameter, 24 inches long and ⅜-inch thick, weighing 77 pounds each. The case is developed in a gas mixture of 40 cubic feet of city gas and 20 cubic feet of ammonia per hour. This mixture is held at a temperature of 1500 degrees Fahr. for two hours; followed by gradual retort cooling to 1200 degrees. At this point the gas-mixture flow is reduced by a half until the temperature drops to 900 degrees; then a continued gradual cooling of the parts without ammonia addition and with the city gas flow just sufficient to prevent infiltration of air into the retort. No quench is employed in this case. A file-hard surface is formed without any distortion.

Oven and Rotary Retort Furnaces: Another type of furnace consists of an oven with an internal heat-resisting alloy bell operating when and as the furnace door lifting mechanism is manipulated. This unit has been developed especially for heat-treating shops engaging in ni-carbing and other processing treatments for which a definitely controlled atmosphere is required.

Also, the rotating retort batch-furnaces used extensively for controlled gas carburizing of small parts are well suited for the exacting ni-carbing cycles, such units having working capacities of from only a few pounds up to as much as a ton or so per charge. Rotary retort continuous machines capable of ni-carbing 800 pounds of work parts per hour are also in use at the present time.

It is the completeness of these various types and size ranges of equipment now in use, with various compositions and mixtures of treating gas; the wide latitude of work temperatures that may be employed, with approved methods of parts cooling and quenching; the sensitiveness of closely controlled hardening to case depths of from 0.001 to 0.035-inch that combine to make ni-carb surface hardening an outstanding metallurgical development. The method has made possible better bearings and other vital machine parts—work that is clean, super-hard and more wear resisting. At the same time it is produced economically and under favorable working conditions.

REFUGEES FROM A TORPEDOED TANKER

DERELICTS from the ocean bottom: Salvaged from a United Nations' tanker after long immersion in salt water, these two blowers manufactured by Ilg Electric Ventilating Co., Chicago, were found to still operate. They were returned to the plant recently for testing

Develops Cleaning Compound for Machinery

A cleaning compound for use on machinery, windows, floors and factory rest rooms is announced by Trojan Products & Mfg. Co., Chicago. Called Elektro-Purjit, it will not burn or harm the hands.

The chemical also removes paint without rubbing and disinfects as it cleans. It is said to work equally as well on lighting fixtures and reflectors.

PRECISION
FROM START TO FINISH

War production demands precision from start to finish—from toolroom to production shop. Without precision, the vast quantities of war supplies so urgently needed could not be produced in time—for efficient mass production is based on a degree of precision which permits the perfect interchangeability of thousands of duplicate units.

Because of their dependable precision, South Bend Lathes have long been favorites in the toolroom. For this same reason, plus a fatigueless ease of operation, they have been equally popular for manufacturing operations. And now South Bend Turret Lathes are stepping up production in the shops of hundreds of war industries—with no sacrifice in precision.

South Bend Toolroom Lathes and Quick Change Gear Lathes are made in five sizes: 9", 10", 13", 14½" and 16" swing. South Bend Turret Lathes are made in three sizes: 900 Series, 1000 Series, and No. 2-H. Write for a catalog and the name of our distributor located near you.

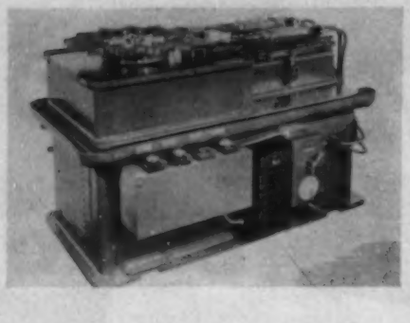
SOUTH BEND LATHE WORKS

LATHE BUILDERS FOR 35 YEARS **Dept. 895, South Bend, Indiana, U.S.A.**

INDUSTRIAL EQUIPMENT

Flame Hardening Machine

Hydraulic Machinery Inc., 10421 Grand River, Detroit, announces a flame hardening machine which goes through its complete cycle before stopping. Its



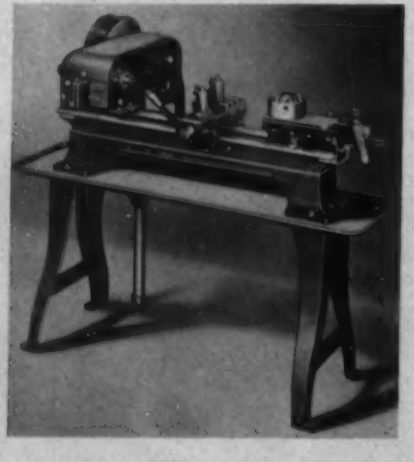
base and external housing structures are of welded steel design.

Electrical control and hydraulic power as a motive source provide positive and flexible operation. Parts are on the outside that require adjustment and routine maintenance. Pilot light, burners and water coolant are located on the rear side and are completely adjustable. Working parts are adequately shielded from heat in the machine proper. Water is used as a quenching medium and it is completely sealed from the actuating mechanism.

Screw Machine

Logan Engineering Co., 4901 Lawrence avenue, Chicago announces an entirely new No. 830 hand screw machine with a capacity of ⅝-inch round bar stock for continuous production of small parts. It is built to meet specifications of the company's lathes.

Features of design and construction



include: Precision ground bed with two prismatic V ways and two flat ways; precision, preloaded ball bearing spindle mounting; turret holes are bored from the headstock; turret and cross slide are provided with adjustable gibs to compensate for wear.

A new speed collet chuck for handling round work which may be fed through the spindle, and a bar-feed attachment are offered as accessories. According to the manufacturer, the machine is not competitive with any other similar turret lathe. It enables producers to free existing machines for heavier work.

Infra-Red Heat Lamp

Birdseye Division, Wabash Appliance Corp., Brooklyn, N. Y., announces a complete line of infra-red heat lamps, designed in keeping with the limitations imposed by the War Production Board.

The line includes six clear types, three ruby and four reflector types. All feature the M-type tungsten filament and

have their bases reinforced with asbestos-lined mechanical straps to withstand the terrific temperatures of tunnel installations. The reflector types have built-in reflector linings of pure silver sealed inside the bulbs. Average burning life on all is in excess of 6000 hours.

Testing Tube

Transformer Division, General Electric Co., Schenectady, N. Y., announces an improved 35,000-volt oil and insulation testing set, which can be converted for high-potential tests on a variety of materials and products. It consists of a 2-kilovolt ampere 35,000-volt, liquid-immersed testing transformer; an air-cooled variable-voltage autotransformer; an air circuit breaker for opening the circuit after the test is completed; an oil-testing receptacle; a push-button station; and a double-range voltmeter for accurate indication of the insulation breakdown voltage. All parts are mounted as a unit on a 3-wheel, ballbearing truck for easy portability.

The oil-testing receptacle contains the test gap and is so mounted on the high-voltage terminals that simply tilting the receptacle empties the tested oil into a drain pan in the transformer cover. The oil-testing receptacle is easily removed to convert the set for standard high-po-

tential tests on such materials and equipment as sheet insulation, cable, small transformers, rubber gloves, small motors and generators, circuit breakers, line materials, bushings, and insulators.

Control of the testing set is assured through use of the push-button which must be depressed and held down throughout the test. A red signal lamp warns the operator when the transformer is energized.

Turret Lathe

South Bend Lathe Works, South Bend, Ind., announces a new floor turret lathe for rapid production to close tolerances of small chucking or bar work. It also is able to handle second operation work.

The lathe has a 10-inch swing over

the bed or saddle wings, 1⅜-inch hole through the headstock spindle, and 1-inch collet capacity. It is equipped with both a compound rest and a handlever cross slide, both being interchangeable.

The latter is furnished with front and rear tool blocks which provide positions for three tools. A quick-change gear box

supplies 48 longitudinal power feeds for the universal carriage, 48 power cross feeds for the compound rest cross slide, and 48 thread cutting feeds, 4 to 224 per inch.

The handlever-operated bed turret indexes automatically and has an adjustable stop for each of the six turret tool positions. The underneath motor drive and back gears deliver 12 spindle speeds ranging from 50 to 1357 revolutions per minute. The lathe is offered either with or without coolant equipment.

Magnetic Separator

Stearns Magnetic Mfg. Co., Milwaukee, recently introduced an improved magnetic log washer for treating fine abrasive and similar materials in the wet state. It consists of a single ribbon screw conveyor operating at 30 to 32 revolutions per minute on a slope with adjustable frame supports over the magnetic field and driven by a gear reduction motor.

Material to be treated is fed into the

washer trough. Tailings are discharged at the lower end and the concentrate at the top. Magnetic flux of coils is controlled by rheostats. Units are offered in various sizes, depending on capacities. They operate from direct current up to 300 volts, or from motor-generator sets.

Airpainting Unit

Paasche Airbrush Co., 1909 Diversey drive, Chicago, has introduced a new type F990 turntable automatic airpainting unit for coating 20, 37, and 40 millimeter shell—clover leaf end plates for 75 millimeter shell—fuse caps and other parts. Taking little floor space, it is completely automatic, the only manual operation required being loading and unloading. The airbrushes apply an atomized spray providing a uniform finish. They are easy to adjust and all working parts are fully enclosed.

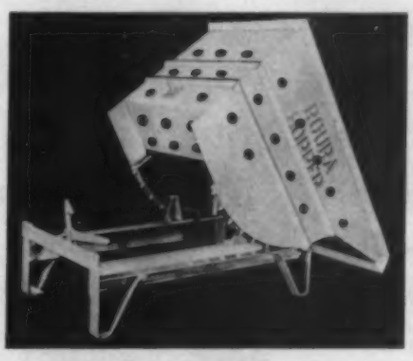
Explosion-proof electric motor drive and speed reducer of the painting unit are fully enclosed in housing, but are accessible through an access door. Its pressure feed material tank is equipped

with a Clamptight cover—a feature that saves considerable time in handling.

Hot Forgings Hopper

Roura Iron Works, 1405 Woodland avenue, Detroit, announces a new model, automatic-dumping hopper for handling hot forgings, castings or other materials. It is offered standard in one yard capacity with perforations to suit the user's requirements.

The hopper is fabricated of full 3/16-inch plate and electrically welded. Its heat-proof construction prevents warping or buckling. The hopper unloads auto-



matically when trip lever is released and returns to loading position when empty. Standard units, according to the company, will fit any standard type of tiering truck.

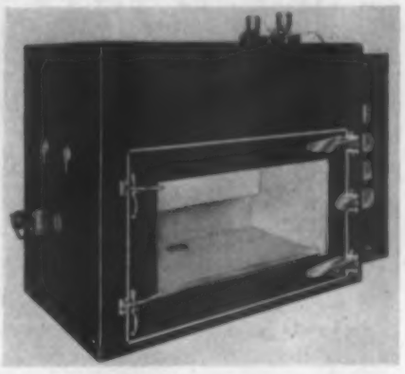
Testing Chamber

American Coils Inc., Newark, N. J., recently developed a new chamber for testing instruments under extremes of cold and heat. Its range of temperatures extends from minus 53 degrees Cent. to plus 70 degrees Cent. It includes apparatus for both mechanical refrigerating and electrical heating.

Model illustrated is known as model RTC-1, and consists of a 2-stage condensing unit, heat exchanger, liquid subcooler, coil or evaporator, expansion valves, cabinet and forced-draft strip heater, along with thermostats and other controls and connections for each.

Entire operation of the unit is controlled from a front panel board. The testing cabinet is in itself a precision machine and when used to test instruments assures scientific control of all temperatures. It can maintain the temperature at any level so actual service conditions may be created.

Refrigeration is rapid, and the cabinet without production load should reach



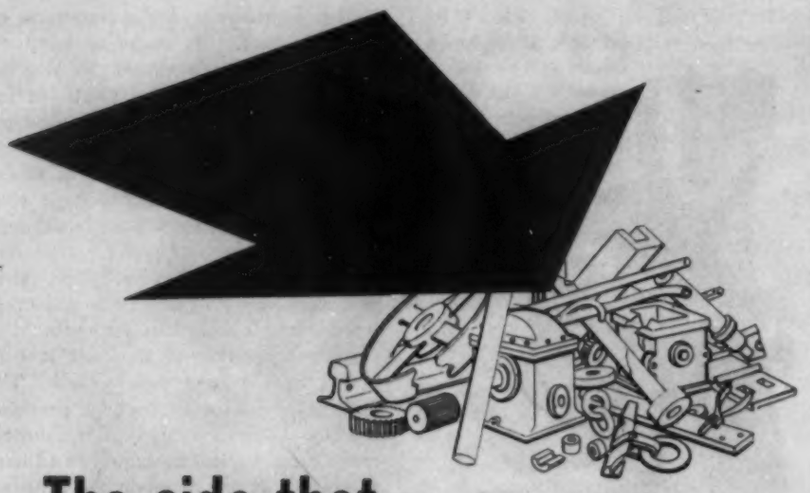
minus 50 degrees Cent. in approximately one hour. The compressor maintains the refrigerant temperature in the coil and is controlled solely by a pressure switch. The coil in turn cools the chamber by means of recirculation of the air within the cabinet.

The electrical hookup is such that when the master switch is in the refrigeration position, the heater circuit is automatically disconnected. When the master switch is in neutral or in heater position, the coil is automatically pumped dry of refrigerant.

Observation of instruments being tested is provided by an inner door with five glasses sealed and dehydrated against future passage of moisture. The all-steel cabinet occupies space 83 x 56½ x 42 inches deep. The usable interior is 59 x 28 x 30 inches.

Sanding Machine

Detroit Surfacing Machine Co., Detroit, announces a new model XLD reciprocating sanding machine feature of which is a detachable bottom plate—the part to which the felt, rubber, or



The side that can *THROW THE MOST STEEL* will win the war

Steel is the master of offense and the mills are producing it in ever-increasing amounts. But, steel takes scrap metal — plenty of it — 1000 pounds is required for every ton of steel produced.

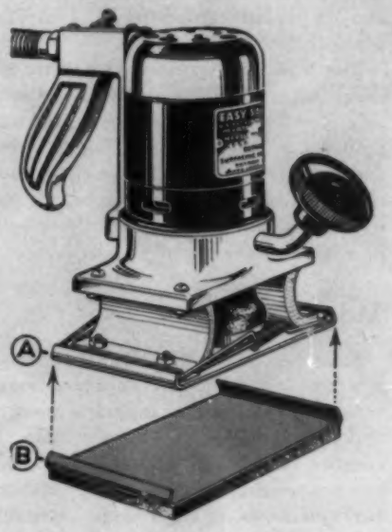
Right now there is a serious shortage of scrap at the mills. Reserve stocks are becoming depleted. Deliveries by regular suppliers of scrap are falling short. The mills must have 6,000,000 *extra* tons of iron and steel scrap NOW to insure a continuation of production to meet war demands.

There's plenty of scrap lying around everywhere — in plants, shops, garages, farms, homes. This must be salvaged. Everyone is urged to do his part. Don't overlook any possibility — every pound counts. The metal dealer near you will pay you for it and send it to the mills. Don't delay — scrap is needed NOW — not next month or next year, but right NOW!

WE NEED YOUR SCRAP METAL
Go over your plant or shop carefully. There may be enough scrap metal lying around to build a tank, a gun, or some other war essential. Remember, steel takes scrap — 1000 pounds for every ton. Salvage all the scrap metal you can lay your hands on and do it NOW!

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

composition sanding pad is secured. The plate permits instant removal of one type or size pad and installation of another. Detachable plates are offered with pads of sponge rubber, felt, or composition



in widths from 1 to 3¾ inches and ¼ to 1 inch thick. Therefore instead of using one pad for all applications, special pads can be used to fit the specific job. Also it provides instant change-over from wet to dry work, without waiting for the pad to dry. Operating speed of sander is 3000 strokes per minute.

Double-End Grinder

Willey's Carbide Tool Co., Detroit, has introduced a new double-end grinder design which incorporates improvements that provide greatest efficiency in free

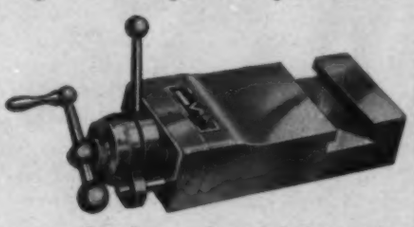
hand grinding of tungsten carbide tipped tools, as well as other types.

Furnished with coolant pump and pan for wet grinding, the unit features a special motor available for 220 or 440 volts, 60 cycle, three phase running at 3450 revolutions per minute. Its tool rest table is adjustable to all angles between 30 degrees toward the wheel and 30 degrees from the wheel. Table also is ad-

justable, with quick-clamping features incorporated to compensate for wheel wear.

Lathe Compound

Vard Inc., Pasadena, Calif., announces a new lathe compound which makes it possible to cut threads right up to a working shoulder at normal lathe speeds. A supplementary attachment, replacing the cross slide of the lathe, it holds a single or multiple tool post and is



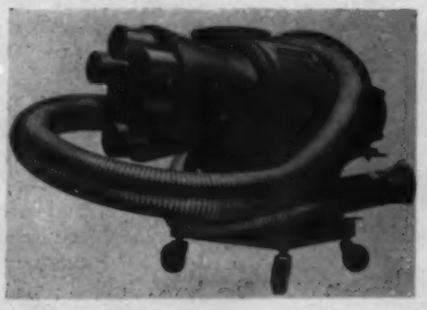
equipped with a graduated dial accurate to 0.001-inch.

With one transverse motion of the hand, a quick release lever withdraws the tool point 3/16-inch. By simultaneously reversing the lathe and releasing the compound the next cut can be set on the compound dial with one hand as the lathe compound reverses the tool to the starting point of the next cut.

Working parts of the lathe compound are of special steel, ground and hand finished. The compound may be installed on any 10-inch South Bend lathe

Exhauster, Ventilator

Chelsea Fan & Blower Co., 1206 Grove street, Irvington, N. J., is offering a new Octopus exhauster and ventilator for use in ship holds, mines, sewers, tunnels and welding departments. It may be placed in any convenient place between the working area and the open air, and is connected by means of flexible



metal hoses to the area to be ventilated.

The exhauster is powered by a heavy-duty ball bearing motor equipped with overload protection. It can easily be converted into a fresh air ventilator by changing the position of the tube adapter which is part of the equipment. One to six nozzles can be used. Caps are provided for nozzles not in use.

All Production Action Depends on Movement of Materials . . . ONE OF THE QUICKEST, EASIEST WAYS TO STEP-UP PRODUCTION EFFICIENCY, GAIN TIME, CUT COSTS, SAVE SPACE IS TO SYNCHRONIZE ALL HANDLING OPERATIONS

★ ★ ★ Towmotor, the "one man gang," correlates man-power, materials and machines for maximum efficiency of movement. That's why every Towmotor manufactured today goes to Army, Navy, or war production plants. Write today for a copy of *"The Inside Story"* and learn how Towmotor fits into your plans now and for post-war production.
TOWMOTOR COMPANY, 1221L East 152nd Street, Cleveland, Ohio

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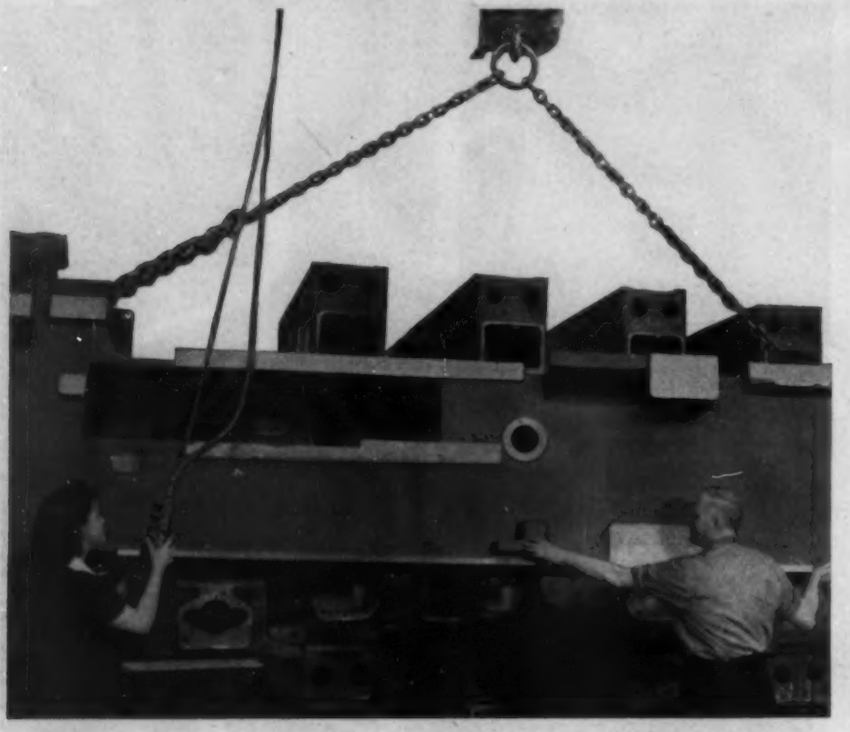
CHAIN INSPECTION IS MOST IMPORTANT!



● The chances of accidents, injuries and deaths are always multiplied when untrained workers have to drive unfamiliar tasks at high speed.

If you have such operating conditions, all your chains should be put in first class shape, ready for the abnormal loads which might be laid upon them.

May we offer a few practical suggestions to be passed on to your men:

Inspect Chains for

1. Battered or bent links
2. Cracks and distortion of welded rings and hook eyes.
3. Stretch.
4. Wear.
5. Gouge marks.
6. Open welds.
7. Links with peened, hammered or polished surfaces which indicate the chain should be annealed or normalized.

● We have been fortunate in the ideas brought to us by our customers regarding their experience with chain. This data, added to our own laboratory and field experience in the selection, application, use, inspection, and maintenance of chain, is at your disposal on request. Outline your problems, we'll do our best to help.

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Quality Control

(*Concluded from Page 94*)

a magnet must remain permanent over a period of time. Stability as a function of time is of paramount importance. Therefore stabilizing treatments and process control which tend to give stability must be carefully followed.

Fig. 10 shows the stability that can be accomplished by proper stabilizing treatments of the magnet shown in Fig. 1. In order to insure this control, samples are taken each week from production and subjected to extremes of temperature, and measurements made both before and after the temperature cycles are given. Three cycles of extreme temperatures, minus 40 to plus 75 degrees Cent., accomplish practically an end result in the drift of the magnet strength as a function of time. This is a well-established fact based on the results of a long investigation and is quite valuable in that it allows a rapid check to be made weekly of the quality of the product.[2]

Charts Interest Operators

Groups of magnets are taken each week and subjected to these extremes of temperature and their change in strength measured. This is plotted as a control chart, Fig. 11. It is interesting to note that a high degree of control is obtained. While this figure shows only the average value, limit lines are actually used which take into account the normal variation and which show at a glance whether or not the process is out of control.

In summary, the above example shows that much can be accomplished by the use of a simple and logical control process based primarily on plotting the actual distribution curves. Losses due to low magnet strength which were running on the order of 10 per cent have been reduced to a point where they are on the order of 1 per cent by the application of these methods. Simplified record forms and control charts posted in full view of the interested operators have gained the interest of the operators in quality improvement.

The same general control processes used here can undoubtedly be used in countless places in industry for the purpose of increasing production and reducing spoilage, which will conserve valuable materials needed for the war effort.

References

1—"Permanent Magnets", J. H. Goss, *Metals and Alloys*, Vol. 15, No. 6, April, 1942.

2—"Braking Magnets for Watt-Hour Meters", I. F. Kinnard and J. H. Goss, Suppl. to *Electrical Engineering Transactions* of the American Institute of Electrical Engineers, June 1941, pages 431-439.

3—*An Engineers' Manual of Statistical Methods*, Leslie E. Simon, Major, United States Army, Ordnance Department, John Wiley & Sons, Inc.

Helpful Literature

1. Copper Tubing

The American Brass Co.—64-page illustrated catalog, "Copper Tubes for Industrial Applications," lists advantages of copper tubes not found in ordinary piping materials. Applications of tubing in industry are explained. Assembling methods, flow of water and friction loss through pipes and tubes are included in discussions. Specifications and general information sections are presented.

2. Cold Finished Steel

Bliss & Laughlin, Inc.—52-page illustrated bulletin No. 1, includes technical data on cold finished bar steels and shafting. It contains comparative tables showing designations and chemical compositions of standard AISI and SAE grades, as well as new NE series of national emergency steels. Supplement manual is furnished. Additional sections will be printed to provide up-to-date information for steel users.

3. Separation Magnets

Stearns Magnetic Manufacturing Co.—8-page illustrated bulletin No. 25-C covers subject of suspended separation magnets. Also discussed is design and construction features. Description of materials embodied in manufacturer's product are included. Catalog lists profitable applications and contains specifications on circular and rectangular types of units.

4. Turret Lathe

South Bend Lathe Works—4-page illustrated bulletin No. 1004 describes new bench model turret lathes. These machines are designed for rapid production of small chucking and bar work to close tolerances. Two models have 10⅝-inch swing over bed and saddle wings, 1⅝-inch hole through headstock spindle and 1-inch collet capacity. They are adapted to second operation work.

5. Care of Generators

Crocker-Wheeler Electric Manufacturing Co.—20-page illustrated catalog No. 500 gives necessary instructions for installation, care and operation of alternating-current turbo-generators. Included with descriptions and explanations are cross-section drawings of typical generator systems and duct systems. Instructions are given for hook-ups and set-ups and specifications listed. Adjustments of field currents are explained.

6. Descaling Nozzles

Aldrich Pump Co.—4-page illustrated folder No. 61-2 covers spray nozzles especially developed for descaling purposes. These units are applicable in manufacture of blooms, bars, strips, tubes and shapes in steel, copper, brass and alloy industries. Illustrations and drawings explain testing, efficiency, durability and uniform flow of unit. Included is useful engineering data for selection and applications of spray nozzles.

7. Direct Fired Heaters

Dravo Corp.—12-page illustrated catalog No. 506 presents tabulations which cover comparative savings in metals by weight and cost based on approximately same required British thermal unit output per hour when direct fired heaters are used. Comparisons of coal, gas and oil units are made.

8. Blast Cleaning

American Foundry Equipment Co.—32-page illustrated, "Wheelabrator Operator's Manual," is written for those concerned with care and operation of "Wheelabrator" airless abrasive blast cleaning equipment. Instructions and suggestions are given for increasing metal cleaning production and decreasing operating costs.

9. Filing System

Visible Index Corp.—4-page illustrated bulletin, "A Vital Unit Towards Winning This War," describes latest developments in line of "Visirecord" visible filing systems. Incorporation of plastics to replace critical metal in this unit is explained in detailed technical article.

10. Belt Maintenance

E. F. Houghton & Co.—16-page illustrated bulletin, "How to Make Your Belts Last Longer," contains reference data and formulas which enable maintenance men to obtain maximum service from belting in their plants. Correct application, tensioning, pulleys, cementing and other factors are included.

11. Abrasives

Mid-West Abrasive Co.—4-page illustrated folder, "Precision Metal Finishing," cites advantages of uniformity of hardness and grain structure in honing and superfinishing stones and grinding wheels. Chart on back cover is guide for selection of proper stones intended for use on steels of known hardness.

12. Welding Rod

Ampco Metal, Inc.—6-page illustrated bulletin on "Ampco-Trode 10" contains physical properties, chemical composition and procedures for various types of welding with this all-purpose, coated aluminum bronze electrode. Number of diagrams show methods of welding, deep groove preparation, building up metal on vertical surfaces, weaving sequence and depositing beads.

13. Bearings

Bantam Bearings Corp.—24-page illustrated bulletin No. 104 presents descriptive material on needle bearings, ball thrust bearings, roller thrust bearings, quill rollers and cam followers. Standard stock size sheets are included giving part number, diameter and length for needle rollers. Specifications are given for all bearings carried by manufacturer.

14. Industrial Insulations

Baldwin-Hill Co.—16-page illustrated bulletin, "Insulations for Industry", presents technical and application data on "Mono-block," rockwool blanket, fill material, pipe covering, insulating cement, felt, "Koldboard", "Weatherseal", miscellaneous and building insulations.

15. High Speed Steel

Jessop Steel Co.—12-page illustrated bulletin No. 442 discusses analysis, physical properties, typical applications, heat treatment, grinding, welding and similar data on "Mogul" molybdenum-tungsten high speed steel. Material is available in bars, rounds, octagons, flats, special shapes, forgings, blocks, dies, blanks and disks.

16. Electrical Maintenance

Westinghouse Electric & Manufacturing Co.—Illustrated chart covers motors, control equipment, lightning arrestors, wiring, fuses, and transformers. Chart is presented to reduce repair time of electrical apparatus for industrial and central station use.

17. Synthetic Elastic

B. F. Goodrich Co.—24-page illustrated, "Koroseal Handbook of Technical Information," tells nature and chemistry of this plasticized polyvinyl chloride synthetic elastic, giving physical properties, plasticizers, stabilizers and pigments used in compounds, together with mixing and processing procedures.

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18. Elevating Table

Lyon-Raymond Corp.—2-page illustrated circular No. 124 gives specifications on "Lyon" hydraulic elevating table which has capacity of 2000 pounds. Unit may be used for transporting dies, lifting work into place, transferring heavy materials or parts, and bringing work up to proper height for working.

19. Well Water Systems

Layne & Bowler, Inc.—30-page illustrated bulletin No. 6-40 is descriptive of well water systems for cities, factories, railroad and similar locations. Details of wells, pumping equipment and accessories are given. Technical data section presents useful information related to water distribution and piping.

20. Hydraulic Oil

E. F. Houghton & Co.—12-page illustrated bulletin No. 2-168 gives full information regarding characteristics and applications of "Hydro-Drive" MIH series of hydraulic oils with improved oxidation stability. Use of this product is explained in all types of hydraulically controlled or actuated machines and equipment.

21. Heat Treatment

Surface Combustion—6-page illustrated folder No. SC-103 discusses industrial furnaces for practically every heat treating operation in production of ships, tanks and airplanes. Typical furnaces are shown in each of these industries, and types of operations performed are described.

22. Press Brakes

The Cincinnati Shaper Co.—64-page illustrated catalog No. B-1 suggests many uses of press brakes and their essential features. Included is dimension sheet of standard sizes for "All-Steel" press brakes. Specifications include series, length, distance between housings, total overall die surface, capacity, horsepower of motor, standard stroke, ram adjustment, throat clearance, flywheel diameter and revolutions per minute, housing plates and ram plates.

23. Finishing Machine

International Machine Tool Corp., Foster division—28-page illustrated bulletin is descriptive of 4 x 18-inch and 4 x 36-inch "Foster Superfinishers" which produce extremely fine and accurate surface finish on cylindrical work. Also described are special finishing machines and attachments for use on cross slides of engine lathes and on turret lathes.

24. Squeeze Riveters

Hanna Engineering Works—28-page illustrated catalog No. 232 is descriptive of extensive line of hydraulic and pneumatic squeeze type riveters for practically every purpose. Equipment is available for squeezing rivets from ⅛ to 2 inches in diameter, with reach from 2 inches to 21 feet. More than 700 styles and sizes are covered.

25. Machinery Maintenance

Reliance Electric & Engineering Co.—Illustrated blotter, "Preventive Maintenance," presents brief suggestions for keeping plant machinery running without breakdown or other troubles. Four admonitions to follow for prevention of motor breakdown under 24-hour production schedules are outlined.

26. Dial Scales

Kron Co.—16-page illustrated catalog, "Technical-Industrial Dial Scales For Victory", describes dynamometer scales in all capacities up to and including 8000 arbitrary units, fuel consumption testing scales for diesel and gasoline engines, lubricating oil consumption and oil flow testing scales for aviation, tank and marine engines. Diagram and specifications are included.

27. Electric Furnaces

Hevi Duty Electric Co.—4-page illustrated bulletin No. HD-441 presents detailed description of box type electric furnaces, available in 20 styles, for application to practically all types of heat treating processes. Specifications are given for units producing maximum temperatures up to 2000 degrees Fahr.

28. Starting Switches

Allen-Bradley Co.—4-page illustrated bulletin and price sheet describes line of "Bulletin 600" manual starting switches for motors rated up to 1 horsepower, 110-220 volts alternating current, and ¾-horsepower, 115-230 volts direct current. These compact switches are designed for starting and overload protection on small motors for all types of equipment.

29. Die Cushions

Dayton Rogers Manufacturing Co.—32 pages of descriptions of manufacturer's equipment, entitled "Pneumatic Die Cushions." Units are self-contained and portable and can be quickly installed on any punch press. They can be applied to dies already in use in place of springs or rubbers. Units are easily lubricated and maintenance required is low. They are said to be ideal for jobbing shops for both short and long runs.

30. Shipping Boxes

Hinde & Dauch Paper Co.—20-page illustrated booklet No. 5, entitled "How to Ship More Economically in Corrugated Boxes," contains timely suggestions for reducing shipping expenses. It shows how economies may be effected without reducing packing effectiveness. Case studies illustrate savings effected through the use of corrugated shipping boxes.

31. Electrode Holder

General Electric Co.—16-page illustrated bulletin No. GET-1062 describes in considerable detail the progressive steps in adjustment and operation of Atomic-hydrogen electrode holders. Right and wrong methods of adjusting electrodes and hydrogen supply, striking arc, controlling arc and starting weld are discussed.

32. Aviation Cleaning

Oakite Products, Inc.—40-page illustrated booklet No. 5562 is entitled "Oakite Cleaning Materials and Methods in the Aviation Industry." It covers essential phases of cleaning required in aircraft production and maintenance. Plant housekeeping work common to aircraft and accessory manufacturing plants, as well as production equipment maintenance, are discussed.

33. Fluorescent Lighting

Sylvania Electric Products, Inc.—32-page illustrated catalog, "Fluorescent Lighting Fixtures," is designed to simplify selection of proper types and quantities of fixtures for all lighting projects. Over 30 models are described. Minimum standards of illumination are given. Included are typical applications, as well as general lighting engineering and maintenance information.

34. Low Temperature Welding

Eutectic Welding Alloys, Inc.—4-page illustrated folder, "Castolin Eutectic," presents new development in welding. Suggestions and applications for production of fabricated parts, such as tools, and assemblies, are given. Welds completed with this process are said to be equal and even stronger than high temperature welds. Metal not being molten, has not been affected by high temperatures.

35. Micrometers

George Scherr Co.—Illustrated circular announces simplification of models in line of "Reed" micrometers. Plain and vernier type micrometers, in 1 and 2-inch sizes, are described. Details of these precision tools are given, as are list prices.

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Steam Generation

(*Concluded from Page 90*)

is made available. It so happens that this plant is located in an industrial area and, therefore, does not require a dust collector. It would have been possible to justify this additional equipment had it been required. On an actual cost comparison the spreader was less than one-half the traveling grate installation. The differential in fuel costs was not sufficient to justify the increase in investment needed to burn the lower cost coal.

Firing Arrangements Similar

The boiler in Fig. 5 operates at a capacity of 75,000 pounds per hour. Its arrangement for oil firing is substantially the same as shown for the spreader stoker application. The only necessary modifications are the stub bridgewall, the rearranged lower frontwall, removal of refractory hearth to make way for stoker wind box and ash pit, and construction of the air duct below floor level. Close by the plant is a residential section and this immediately indicates the necessity for a dust collector. This customer was favorably inclined towards pulverized coal firing. However, a detailed study developed the necessity for extensive changes to the existing setting. To provide adequate furnace volume it is necessary to move the front boiler walls outward. A rearrangement of the bridgewall screen is necessary so that provision may be made to insure a reasonably cool zone in which the ash may be collected. As in the case of spreader stokers, a dust collector is necessary to avoid nuisance ash deposits in the plant vicinity. The cost of these changes, in addition to the necessary pulverizer equipment, was much higher than with stokers. The efficiency differential, in favor of pulverized coal, was not sufficient to overcome the added investment and stokers were installed.

It is clear from the foregoing discussion that many variable and sometimes obscure factors have a direct influence on equipment application. A wide experience and daily contact with problems of this nature make it possible to recognize the real governing conditions. Perhaps the best initial investment is to employ a competent engineer who is well versed in the solution of fuel burning problems. Let him make a careful survey and then select the equipment in accordance with his recommendations. When comparing the various offerings it is advisable to make the purchase on the basis of quality, adaptability of design, performance, range of experience and service facilities, rather than price alone. Apparently high first cost, in many instances, has proved to be the most profitable investment in the end.

"The Yanks are Coming"—
---MORE AND FASTER!

THE job of converting American industry moves swiftly. Yank fighting equipment is moving to every Allied battle front — much more and much faster! To make sure of that, industry is using P&H Zip-Lifts — the time-and-labor-saving hoists that speed the lifting and moving of materials from raw state to finished products—at the mere push of a button. In shops, assembly lines, loading zones and warehouses—they are saving time and energy—making manpower go farther.

P&H ZIP-LIFT
HARNISCHFEGER CORP. MILWAUKEE WIS.

CAPACITIES:
250, 500, 1,000, 2,000 POUNDS

Full magnetic push-button control — preformed non-spinning hoist cables — 3-way interchangeable mountings — and safety limit switch are just a few of the *important* features that make P&H Zip-Lifts the top value among low priced electric hoists.

HONEST DELIVERY DATES

Our biggest job is to make enough Zip-Lifts to go around. While direct war production needs must be served first, you can always depend on P&H's delivery promises.

Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort.

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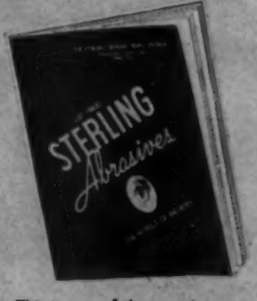
RIGHT in your billet grinding department - - that is where production is retarded or speeded up! That is where you can lessen operator fatigue . . where you can make grinding wheels last longer. The means of doing it are simple -- Sterling Grinding Wheels, built to the demands of your jobs!

Operators - young and old - like to use Sterling Grinding Wheels for billets. Foremen, appreciating the economy of longer lasting wheels, welcome the better performance provided by "The Wheels of Industry". Best of all, your production drive to victory will become faster!



This is one of the most important books a billet grinding department foreman can have in his files. Send for Catalog No. 42 . . you will welcome the information it contains.

Decide now to have a survey made in your billet grinding department. A Sterling engineer, skilled by years of experience in solving steel mill grinding problems, will gladly call upon request and study the grinding requirements of your entire plant. Ask for his service . . . it is our way of helping you to achieve your wartime goal of the greatest possible production in the shortest possible time.

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THE WHEELS OF INDUSTRY

Steel Deliveries Uncertain As Directives Increase

Some cancellations follow reduction of PRP allowances. . . Bar demand exceeds capacity. . . Warehouses to be given better supply. . . Scrap drive provides large future tonnage

DEMAND
Exceeds production.

PRODUCTION
Steady at 99 per cent.

PRICES
No changes in ceilings.

STEEL consumers are given no assurance by mills that delivery will be made during fourth quarter against orders with low ratings, assigned on Production Requirements Plan certificates.

In some sizes of various products, they point out, fourth quarter capacity already is absorbed by directives and further orders have no chance of being filled. In bars, depending on the size involved, definite delivery promise is unlikely on lower than AA-2 priority. While WPB has attempted to balance quantities PRP customers are allowed to buy with available supplies, difficulties appear from the fact that demand for some sizes exceeds quantities that can be produced.

Substantial cancellations are developing because of restrictions in quotas of many consumers operating under PRP. Since certificates began appearing about two weeks ago cancellations have been increasing, some consumers, even with high ratings, finding difficulty in continuing operation unless adjustments are made. In some cases contracts in process for government armed forces have been pared under PRP, pressure by the government agency being nullified by WPB disallowing the tonnage. Where orders have been on mill books for some time producers are disposed to advise customers not cancel, on the chance an adjustment may allow the original ratings to be reinstated.

• • •

Pressure for steel bars, carbon, alloy and cold-finished, has increased to the point that deliveries are delayed eight to ten weeks, even on AA ratings. As a result directives and allocations are on the increase where early delivery is essential. Fourth quarter PRP requirements have not been reduced materially, much tonnage moving against contracts on definite specified releases each month, most reduction being on new business.

Mill sales of steel sheets are limited by restrictions on semifinished steel and sheet metal fabricators are not employed fully on war work, though the number having subcontracts is increasing. Some directives have been issued covering definite tonnages for November delivery where need has been greatest. More sheet tonnage is being provided for warehouses and the latter are in receipt of numerous inquiries for small lots which can not be obtained direct from mills.

Improvement is appearing in steel supply to warehouses as a result of the new directive plan which allows orders to be placed on the basis of current needs rather than on a quota basis related to prior tonnage. War conditions have changed type of products most in demand, rendering the quota system archaic. Proposal by War Production Board to establish five sales regions, to conserve transportation, is of much interest to the trade as it promises to disrupt many long-established trade relationships.

Results of the nation-wide scrap salvage drive have exceeded expectations in many districts, tonnage dragged from hiding places totaling high. Gathering this into central locations and placing it in the hands of dealers has taxed trucking facilities. Dealers find difficulty in handling the accumulations and tonnage delivered to steel mills is not in proportion to the quantity gathered. Further campaigns to obtain industrial scrap are under way, salesmen from warehouses and other branches of the steel industry canvassing plants for obsolete machinery or other steel material not in use.

• • •

Steelworks operations last week continued at 99 per cent of capacity as a drop at Pittsburgh practically balanced slight gains at three other points. Scrap has been eliminated as a factor and only necessity for open-hearth repairs now holds back production. Pittsburgh dropped back 1½ points to 97½ per cent, the level of the preceding week. Cleveland moved up 2½ points to 98½ per cent, Detroit 5 points to 92 and Cincinnati 5 points to 97. Chicago held its rate of 103½ per cent and other unchanged rates were: Youngstown 95, Wheeling 79½, Buffalo 93, Birmingham 95, St. Louis 97, eastern Pennsylvania 96 and New England 95.

Preparation for winter supply of iron ore is going forward and as of Oct. 1 stocks at blast furnaces in the United States totaled 41,173,849 gross tons, compared with 34,841,774 tons a year ago. Ore on Lake Erie docks at the beginning of the month was 5,873,741 tons, against 4,663,629 tons a year earlier. Two additional blast furnaces were blowing Oct. 1, a total of 172, with eight idle stacks, some of which have been relighted since the first of this month.

Ceilings imposed by Office of Price Administration holds steel and iron composite prices at unchanged levels, as for several months. Finished steel composite is $56.73, semifinished steel $36.00, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Oct. 24	Oct. 17	Oct. 10	One Month Ago Sept., 1942	Three Months Ago July, 1942	One Year Ago Oct., 1941	Five Years Ago Oct., 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.84
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	16.00

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Oct. 24, 1942,	Sept. 1942	July 1942	Oct. 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	5.00	5.00	5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron	Oct. 24, 1942,	Sept. 1942	July 1942	Oct 1941
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33
Scrap				
Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	17.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942 The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.69c Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.35c f.o.b. mill.

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit, del. 2.82c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	5100 Spr. flats	0.15
2100	0.75	5100 80-1.10 Cr	0.15
2300	1.70	6100 Bars	1.20
2500	2.55	6100 Spr. flats	0.85
3100	0.70	Carb., Van.	0.85
3200	1.35	9200 Spr. flats	0.15
3300	3.80	9200 Spr. rounds, squares	0.40
3400	3.20	T 1300, Mn, mean 1.51-2.00	0.10
4100 .15-.25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni	0.55 1.20	Do., carbon under 0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.35c, f.o.b mill.

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports, 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24 Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary Cleveland, Youngstown, Middletown, 10 gage

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2¼, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.39	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.

Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex.	62	64
⅛-inch and less	59	60
⅛-1-inch	57	58
1⅛-1½-inch	56	..
1⅝ and larger		

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
½-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	*$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.59
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13 75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942.
† $12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.60c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.06	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‖Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. ‖For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos, f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00-25.00
Do., barge	23.00-25.00
No. 2 lump	23.00-25.00

(OPA May 11 established maximum at Jan. 2, 1942, level.)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed. 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium: ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producer's plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-Rolled Strip Bands	Hot-Rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.53	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.35	4.90	6.70	4.90	4.60	7.15	4.95	7.15	5.95	....	6.60	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.35	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham, Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore: 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia: 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 500-999, Los Angeles, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk)	
No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian (nominal)	
2.5:1 lump, 44%	28.50
3:1 lump, 48%	38.00

Manganese Ore

(Nominal)

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	
S. African, 48%	80.00-86.00
Indian, 50%	80.00-86.00
Brazilian, 46%	78.00-84.00
Cuban, 51%, duty free	85.00
Domestic, 48%, f.o.b. mines	$1.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Basic Open-Hearth Billets, Bars & Bar-Strip	Basic Open-Hearth Blooms, Slabs & Billets	Electric Furnace Billets, Bars & Bar-Strip	Electric Furnace Blooms, Slabs & Billets
NE 8024	.22-.28	1.00-1.30	.040	.040	.20-.35	.....	.....	.10-.20	.45c	$9.00	.95c	$19.00
NE 8124	.22-.28	1.30-1.60	.040	.040	.20-.35	.....	.....	.25-.35	.85	17.00	1.35	27.00
NE 8233	.30-.36	1.30-1.60	.040	.040	.20-.35	.....	.....	.10-.20	.65	13.00	1.15	23.00
NE 8245	.42-.49	1.30-1.60	.040	.040	.20-.35	.....	.....	.10-.20	.65	13.00	1.15	23.00
NE 8339	.35-.42	1.30-1.60	.040	.040	.20-.35	.....	.....	.20-.30	.75	15.00	1.25	25.00
NE 8442	.38-.45	1.30-1.60	.040	.040	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8447	.43-.50	1.30-1.60	.040	.040	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8547	.43-.50	1.30-1.60	.040	.040	.20-.35	.....	.....	.40-.60	1.25	25.00	1.75	35.00
NE 8620	.18-.23	.70- .95	.040	.040	.20-.35	.40-.60	.40-.60	.15-.25	.75	15.00	1.25	25.00
NE 8630	.27-.33	.70- .95	.040	.040	.20-.35	.40-.60	.40-.60	.15-.25	.75	15.00	1.25	25.00
NE 8724	.22-.28	.70- .95	.040	.040	.20-.35	.40-.60	.40-.60	.20-.30	.80	16.00	1.30	26.00
NE 8739	.35-.42	.75-1.00	.040	.040	.20-.35	.40-.60	.40-.60	.20-.30	.80	16.00	1.30	26.00
NE 8744	.40-.47	.75-1.00	.040	.040	.20-.35	.40-.60	.40-.60	.20-.30	.80	16.00	1.30	26.00
NE 8749	.45-.52	.75-1.00	.040	.040	.20-.35	.40-.60	.40-.60	.20-.30	.80	16.00	1.30	26.00
NE 8817	.15-.20	.70- .95	.040	.040	.20-.35	.40-.60	.40-.60	.30-.40	.90	18.00	1.40	28.00
NE 8949	.45-.52	1.00-1.30	.040	.040	.20-.35	.40-.60	.40-.60	.30-.40	1.20	24.00	1.70	34.00

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				Low Phos. Grades		ELECTRIC FURNACE AND FOUNDRY GRADES								
						Heavy Structural, Plate			Cut Auto Scrap					
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	3 ft. and less	2 ft. and less	1 ft. and less	3 ft. and less	2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. Blast Furnace Grades prices refer to mixed borings and turnings, shoveling turnings, and cast iron borings.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less; material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 110

Continued limitations on semifinished steel to sheet mills is restricting direct mill sales of steel sheets. Except for war contracts and subcontracts for ship fittings and similar products much current demand is for small lots at high ratings, which warehouses are called on to supply. The latter are receiving somewhat better supply but much shopping is necessary to obtain just what the buyer needs.

Capacity of sheet metalworking and stamping shops is not fully engaged on war work although more fabricators have taken on work requiring flat-rolled steel than was the case a few months ago. Requirements for civilian defense equipment are sustained, including reflectors and other fabricated parts for dimout equipment. Contracts were closed recently for 2,258,000 stirrup pumps, distributed to a number of producers.

Some steel producers have received directives to supply certain consumers with definite tonnages in November, in addition to warehouse loads under the new system. Such directives have been issued from time to time recently, covering most needed tonnages.

An eastern consumer has placed 15,000 tons of 1-inch strip for high-rated war work, distributed among several mills. The inquiry originally was for more than 25,000 tons.

Directives aimed at striking a better balance between hot and cold-rolled narrow strip tonnage starting Nov. 1 are completed. While cold mills have had supplies cut back in most cases, allocations as a rule appear sufficient to cover finishing quotas, but consumer volume under PRP is rather sharply reduced, in some instances close to 50 per cent. Allocations to rerollers are based on capacity and end-use war requirements, and, there being some excess in both hot and cold-rolled capacity for the country as a whole, restrictions appear more apparent in strip than for some other steel products. Reductions include copper-coated strip for cartridge cups to an estimated 20,000 tons per month; several mills are heavily booked with this tonnage on which the scrap loss is high. New volume with cold-rollers is heavy, but spotty with indications quotas will be readily filled, although somewhat out of balance as to high and low carbon, the former far heavier with some producers.

Bars . . .

Bar Prices, Page 110

Increasing use is being made of directives and allocations in the bar market, including carbon, alloy and cold-finished. Tonnages bearing priorities, even in the top AA group, are scheduled with difficulty for delivery under eight to ten weeks on carbon stock. Estimated requirements for fourth quarter Production Requirements Plan have not been reduced materially, although in scattered cases some paring has been done, but most tonnage is moving against contracts on definite specified releases each month. This volume is about equal to consumption in high end-use products and reductions have been mainly on new business.

An increasing volume of NE steels is being specified, notably by machine tool and chucking equipment manufacturers. Producers of marine hardware

Easier Work • Less Fatigue • No Production Slumps = 50% Less Assembly Time with Phillips Screws

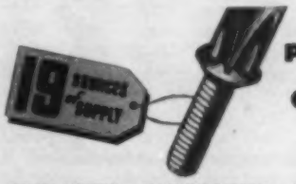
Take a man who is being asked to put his "all-out" effort into assembly work.

You have been giving him slotted screws. Did *you* ever try to *speed up* using slotted screws? It's just inviting trouble, that's all; if you aren't slow and cautious, you'll end up with split screw heads, screwdriver scars and loose assemblies.

But give that fellow *Phillips* Screws and watch him go — particularly if he was using a hand driver before. With Phillips he can use power drivers — electric or pneumatic — for there's no danger of the driver point escaping from the screw recess. It's just a matter of . . . point the driver . . . and let her go. Phillips Screws drive straight automatically and can be "rammed home" without danger of the heads splitting.

No wonder a changeover to Phillips makes such a difference in output — quality — and employee morale. And the big saving in time also means an average of 50% saving in *cost*.

Write to any of the firms listed below for further facts.



PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

are increasing their inquiries to meet growing shipyard needs.

Some midwestern manufacturers of steel forgings who recently expanded facilities now find themselves with insufficient work to occupy their capacity. This results from WPB revisions in shipping schedules, which reduce production. In spite of this forgers are handicapped by lack of steel deliveries from mills.

Production of copper-clad steel for manufacture of bullet cores is getting under way on a large scale. Steelmakers are rolling a special H section which is shipped to processors who apply copper and roll it further.

Plates . . .

Plate Prices, Page 111

November plate allocations have been received by producers and are much in line with those for October. Consumers are ordering lightly while they appraise November quotas and estimate needs for December. This is usual procedure for this part of a month and producers expect no real spurt until time for buyers to file their regular applications, due five days before the close of each month.

Producers have made quite a point of urging customers to file their orders as they arise and thus level out the month-end paper work. In this they have met only moderate success.

Pipe . . .

Pipe Prices, Page 111

Only slight improvement has resulted thus far in merchant steel pipe receipts under maintenance and repair and new 1940 quarter percentage directives, car lots against the latter being promised later this quarter. Most replacements still are geared to extended higher priorities and distributors entitled to the most tonnage under new directives may expect a few additional car lots every quarter. Two cars will be the limit for some.

For some time pipe sellers have been anxious to take high-rated volume and a few sold substantial tonnages on direct shipment, with a view to extending the priority for additional tonnage. This has not always worked out as mills have been limited on semifinished steel under mill quotas. Only in rare instances has this procedure bolstered inventories. Stocks of seamless tubing are small and producers have little tonnage left after covering aircraft needs, on which they are booked heavily.

On several hundred tons of condenser tubes, including Boston deliveries, Wolverine Tube division of Calumet & Hecla Consolidated Copper Co., Detroit, and Bridgeport Brass Co., Bridgeport, Conn., are low.

Cast iron pipe orders are confined to government and war requirements. Pig iron allocations based on most important needs allow slight production for low-rated volume. Suppliers of iron pipe fittings have quoted on large Navy inquiries and on valves, aggregating a large sum.

Southern cast pipe foundries are operating at the highest rate for six months or more, practically all on war work. In spite of the high priority applying to their production many are short of enough pig iron to allow capacity operation.

Wire . . .

Wire Prices, Page 111

Better balance between semifinished, finishing mill schedules and distribution is attempted with directives allocating mills fixed tonnages of both, based on importance of end use, starting Nov. 1, Pressure is being exerted to route semifinished to mills from suppliers located nearest their plant, to reduce cross-hauls.

Bookings are in excess of shipments, demand for aircraft alloys mounting. Lend-lease requirements for wire are heavier and include large tonnages of music wire. On some high carbon round wires, producers are booked to the middle of 1943. While the aggregate volume of specialties is maintained, additional items are being curtailed under war pressure and demand is more concentrated on fewer products with individual orders for the remainder larger.

Structural Shapes . . .

Structural Shape Prices, Page 111

Shape deliveries still can be obtained in six to seven weeks against high-rated orders but the tendency after several weeks of easiness is to stiffen. This is not due to improvement in structural demand but rather to disposition on the part of Washington to limit steel for shapes to increase tonnage for other products.

Fabricators expect demand to shrink in the near future as war plant extension and building near their end and trend to reinforced concrete and wood continues.

A small midwestern fabricator has given up structural contracting and is devoting its efforts to fabrication of racks for airplane engine testing, gantry cranes, scaffolding, construction dollies and similar items.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 111

Restrictions on construction have backfired in the concrete bar market to such an extent that there is actually an excess of steel for which there is no market. Because of the functional nature of concrete bars, it is possible to roll them from steel which is not suitable for any other product. Because of the tremendous volume of steel being produced for merchant bars and other bar mill products, while the percentage of off-heat material remains more or less constant, the tonnage of this material has increased substantially. Under normal conditions all such material is rolled into concrete bars and reaches the market in that form. However, limitations on new construction projects are so strict that demand for concrete bars is considerably less than the tonnage of off-heat steel now available for their production.

Some sellers of new billet concrete reinforcing bars say they are prepared to ship bars against unrated orders if any such construction order could be approved. This is true mainly in sizes under one inch. Because of heavy demand for merchant bars in sizes over one inch, little time is available for production of larger concrete bars. However, most construction work calls for bars under one inch.

New business for October is running somewhat ahead of September but still far below the average of first half. Most current new business is coming from expanding industrial plants, with a substantial tonnage for army and navy bases, and some tonnage is still moving into miscellaneous government projects, especially in connection with hydroelectric developments.

Some sellers see a possibility of OPA action reducing the ceiling on rail steel from $2.40 to $2.25 per 100 pounds, as few contracts have been let recently above the $2.25 price.

Pig Iron . . .

Pig Iron Prices, Page 112

Apparently few pig iron consumers have been forced to suspend operations completely in spite of the fact it is increasingly difficult to obtain full requirements of pig iron where ratings are in the lower brackets. Some melters, unable to obtain sufficient war work for economical operation, have continued in the hope of a turn for the better. It is believed changed ammunition requirements will give gray iron foundries a new lease on life, unless it comes too late to save them.

Particular difficulty has been experienced by manufacturers of stoves, soil pipe and sanitary ware. Some aid has been given through orders for test bombs and some foundries have been able to convert to steel castings, though the latter are comparatively few.

Many foundries find changes in needs of their customers, in some cases smallest buyers in normal times have become the largest. Some foundries have an almost entirely new list of customers, one foundry in the East having lost all its former consumers but has sufficient new customers to keep fairly busy.

Steel foundries are operating steadily and have large order backlogs, as ordnance requirements call for large quantities of steel castings. Malleable founders find comfort in statements by government representatives that there is a growing trend toward substitution of malleable iron castings for nonferrous castings, because of shortage of copper.

In the Pittsburgh district the pig iron situation will be eased by blowing in of the Neville Island blast furnace of the Pittsburgh Coke & Iron Co., which has been down for enlargement and relining since Aug. 1. This will relieve pressure on other merchant stacks which have been meeting allocations for the district.

Scrap . . .

Scrap Prices, Page 114

Scrap collected in the recent drive is slow to move to steel mills because of its diversified character and lack of baling capacity in most centers, to handle the large proportion of light-gage material.

Scrap shipments from 40 yards in the Chicago district were 4600 tons per day in the week ended Oct. 20, WPB salvage director reports. This was 300 tons per day more than in the preceding week and more than 50 per cent higher than Sept. 1, when the rate was 3000 tons daily.

Steel mills in the Pittsburgh district have fairly good supply of scrap, though little more than current needs are being met and stock piles are not increasing materially. Steel foundries have some difficulty in obtaining low phos scrap for electric furnaces as most of that

grade is in pieces more than three feet long and it does not pay dealers to cut it down. Receipts are increasing, partially as a result of the general salvage drive and also because of greater effort on the part of dealers. Industrial salvage section of the War Production Board has organized four groups to urge salvage organizations in industrial plants. These include steel salesmen, warehouse salesmen, utility company salesmen and members of the sales executives association and their staffs. River movement of scrap from the South is hampered by lack of barge capacity, volume of other freight bound upriver having increased materially.

Some of the household scrap collected in New York City will be moved direct to steel mills for preparation, bypassing dealer yards. The ceiling price, $15.33 f.o.b., will be paid, minus freight and preparation charge, including baling. Bethlehem Steel Co. will take 500 tons daily, which will require 50 cars, as only 10 to 11 tons can be loaded in a car because of its bulk. Nine dealers are preparing about 350 tons a day, paying the city $4.50 per ton. Industrial scrap and miscellaneous material from normal channels is coming out more freely. Most is moving to eastern Pennsylvania and some to Buffalo. Bids will be taken Nov. 6 on wrecking of the elevated storage yard on 159th street, Manhattan, which includes 7000 tons of steel and rails.

St. Louis reports results of the scrap drive beyond expectations but character of material makes it slow to prepare and deliveries to mills are delayed. One large melter is cutting into reserves about 1000 tons per week and has only two weeks supply on hand. In some instances receipts are above needs and inventory is being increased. To last midweek 80 Missouri counties, including St. Louis and Kansas City, accounted for 57,685 tons. St. Louis schools collected 7183 tons. Dealers complain they are only about breaking even on the miscellaneous collections, cost of handling, sorting and cutting being high.

Northern Metal Co., Philadelphia, has been given the contract for scrapping five obsolete submarines, estimated to yield about 3000 tons, most of which will be high-grade steel scrap.

An amendment by WPB to its order M-72-a makes it obligatory for more than 400 municipalities to enlist their regular trash collection agencies in systematic collection and segregation of prepared tin cans, as a step toward the goal of 1,000,000 tons of steel scrap and 10,000 tons of pure tin from used cans. Municipalities affected are all those of 25,000 population or over in 15 northeastern states, including Connecticut, Delaware, District of Columbia, Illinois, Indiana, Kentucky, Michigan, Maryland, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, West Virginia, and the cities of St. Louis, Minneapolis, St. Paul and Duluth. Cans can be sold only to shredding or detinning plants and those engaged in precipitation of copper.

Buffalo collections as a result of the newspaper drive yielded 115 pounds per capita and with 132 pounds in a previous campaign brought the per capita to 247 pounds. Scrap yards were unable to accommodate all the material and about 450 tons was dumped on a city-owned lot for future attention. Collection could not be completed Sunday and all city equipment was used Monday to gather the remainder.

Tin Plate . . .

Tin Plate Prices, Page 111

Althongh conditions in the tin plate industry vary from company to company, generally speaking operations will

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.30 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 8% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings, each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

Conserve Cutting Tools at HIGH SPEED

• Holding supplies for some future use is not always a saving. True conservation is getting the most production from equipment in current use.

KENNAMETAL* IS DIFFERENT FROM OTHER TOOLS

Most tools are conserved by slowing down production rates. KENNAMETAL, however, works best at high speeds for greatest production per tool life.

Past operations in the field and exhaustive tests by McKenna Metals Company show that a deep cut, moderate feed, and high cutting speed assure an excellent machined finish, and highest production rate compared with tool life.

The table below shows correct combinations of speed on steels of various ranges of hardness for best results with KENNAMETAL on your boring, turning and facing jobs.

HARDNESS OF WORK Rock. C	Brinell	Sclr.	SUGGESTED SPEED Surface Ft. Per Minute
65	682	93	20 to 30
60	601	83	30 to 50
55	545	75	50 to 60
51	495	69	60 to 80
45	427	62	80 to 100
40	370	54	100 to 150
35	323	46	150 to 220
30	276	42	220 to 300
25	249	38	300 to 400

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continue to decline as a result of WPB limitations. Because quotas established by WPB for the industry were late, many companies continued to operate during October at the same rate as in preceding months. These companies found when the reduced quota was announced that they had already completed October tonnage and were well in November. As a result, operations over the balance of the year will have to be cut drastically to stay within the limits.

Some producers contend that limitations are too strict and do not provide for inventory in preparation for the seasonal demand beginning early next year. While a good many uses of plate have been restricted and limited by various orders from War Production Board, the amount going to the food pack has not been drastically changed nor have the seasonal peaks been modified to any extent.

New electrolytic tinning lines are beginning to produce. The first has been in operation for about a month and excellent results are being obtained. Production limitations will not permit peak operation, and as a result the industry will probably have to produce more hot-dipped plate next year than was anticipated to keep up with demand.

Warehouse . . .

Warehouse Prices, Page 113

Heavy demand for warehouse steel further lowers and depletes inventories pending an expected improvement in the volume of replacements under directives effective Nov. 1. Not until late that month are directive deliveries against highest and oldest extended priority ratings expected in tonnage sufficient to afford much relief. Most distributors have high ratings to extend to warrant improvement in replacements, but doubt is expressed enough steel will be forthcoming to cover sales on A-1-a, a priority which must be filled by the jobber, if material is available, for application against war requirements. Shortage of hot and cold-rolled carbon steel bars continues acute with most sellers, notably the larger and extreme smaller diameters. Narrow cold-rolled strip is also tightening both as to supplies and priorities required, AA-2 needed in more instances. On top ratings, cold-rolled sheets are available from some mills, and scattered improvement is noted in black sheets, galvanized being tight with light current deliveries moving to consumers as received.

Machine tool users of alloy steels are taking up open-hearth NE steels in better volume, 8739 for hardening and 8620 carburizing. To broaden the use of these alloys in the aircraft industry, some change to electric furnace grades in the 9400 series is being considered, hot and cold-finished material applicable to both aircraft and present machine tool requirements. To date relatively little open-hearth NE steel has been accepted for aircraft, including engine builders.

Heavy demand for alloys is being directed at warehouses and inventories are depleted. Flat cold-finished bars required for tooling jigs, fixtures and small tools are especially tight; also bar machinery, high speed and higher tungsten, molybdenum, chromium and nickel alloys. For the latter four, most of the current substitution, which mount, are being made.

Much interest centers in the proposal by WPB to set up five sales regions in an effort to confine mill shipments as far as possible to each area, to conserve on transportation. This would dislocate many long-established trade relationships.

A large eastern producer of a diversified line, in addition to the usual warehouse directives he has been receiving singe Aug. 1 on shapes and bars, has also received a November directive on narrow strip. His jobber directives for bars and shapes for November were substantially heavier than for October.

At least two eastern sheet mills have been actively canvassing warehouse business for delivery over the next two months. This is taken to indicate warehouse loads are in excess of their warehouse bookings, an unusual situation under present general conditions. This may be explained by the possibility that until recently these mills have been virtually out of the sheet market, while devoting their efforts to strip plate, on which there now is less pressure.

Metallurgical Coke . . .

Coke Prices, Page 111

Beehive coke production in the Connellsville region is increasing at about the same rate as over the past few months. During the last six weeks about 150 new ovens have been completed and about 200 ovens have been lighted. About 1000 ovens are ready for use in the district but have not been fired. These are less than 10 per cent of the total

YOU CAN DEPEND ON ELECTRO-COATED
THOMASTRIP

THOMAS cold rolled strip steel with electro-coated finishes has the proper characteristics to meet the requirements of many jobs which formerly used non-ferrous metals. These coatings will not crack or peel. Plating operations in your plant may be completely eliminated, and your parts will move directly to assembling or packaging departments uninterrupted by costly handling and delays for plating.

Send your problems to Thomas. We will make and furnish special test samples for you. Write today.

Thomas Strip
Bright Finish Uncoated or Electro-Coated With Nickel, Zinc, Copper, Brass

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
THE THOMAS STEEL CO.
WARREN, OHIO

available. Some of the new ovens have been started solely as a result of increased price ceilings and there is some question whether all now active will be able to continue at present cost and price levels.

Foundry coke output is steady, with demand fairly active. Furnace coke demand has eased slightly in the past few weeks as a result of new by-product ovens being brought into production before new blast furnaces they are to supply have been completed.

In general, coke users have been building stocks to provide a cushion for winter and as a hedge against possible transportation difficulties.

Iron Ore . . .

Iron Ore Prices, Page 113

Blast furnaces in the United States consumed 6,933,602 gross tons of Lake Superior iron ore in September, compared with 6,953,237 tons in August and 6,290,116 tons in September, 1941. Cumulative consumption to Oct. 1 was 61,575,518 tons, compared with 54,971,529 tons in the comparable period in 1941.

Ore on hand at blast furnaces in the United States Oct. 1 totaled 41,173,849 tons, against 36,887,463 tons a month earlier and 34,841,774 tons a year ago. Tonnages at Lake Erie docks in the United States were 5,873,741 tons, compared with 5,111,798 a month earlier and 4,663,629 tons Oct. 1, 1941.

Canadian consumption in September was 206,286 tons, against 201,965 tons in August and 157,423 tons in September, 1941. To Oct. 1 Canadian furnaces smelted 1,836,134 tons, compared with 1,183,959 tons in the same period in 1941. As of Oct. 1 Canadian furnaces had on hand 1,374,015 tons of ore, compared with 1,236,911 tons a month earlier and 1,264,626 tons a year ago.

Blast furnaces active in the United States Oct. 1 numbered 172, compared with 170 a month ago and 172 a year ago. Canada had nine stacks in production Oct. 1 and Sept. 1, against seven Oct. 1, 1941. Eight furnaces were idle in the United States Oct. 1, but all Canadian furnaces were blowing.

Addition of two ore-carrying ships to the American Great Lakes fleet between Sept. 15 to Oct. 15 brought the number of ships in the trade to 305, the largest number since the fall of 1938 and the largest trip capacity in history—2,803,090 gross tons. This is an increase of 24,950 tons over Sept. 15. According to the Oct. 15 report of C. C. Lindeman, statistician for the M. A. Hanna Co., Cleveland, addition of the new IRVING S. OLDS, and return of the W. E. CORY to service by the Pittsburgh Steamship Co. has increased the trip capacity of that fleet to 757,200 tons, the largest in its history. This is without the services of one of its carriers, which is under repair. In addition to the 305 American vessels in service, 35 Canadian ships have been in the American ore trade this season.

Steel in Europe . . .

Foreign Steel Prices, Page 113

London (*By Cable*)—Steel producers in the Birmingham area are heavily booked to the end of the year to meet Great Britain's war requirements. A small tonnage is being allowed for most pressing civilian needs. Demand for steel plates is on the increase for ships, tanks and other essentials. Supply of scrap is sufficient for all needs. Production of tin plate is being increased somewhat.

Pacific Coast . . .

Seattle—The search for scrap has reached into every household in the Pacific Northwest spurred by an aggressive campaign. Metals of all kinds are being brought from cellars and garrets, creating a problem of segregating and delivery. The output is so heavy that dealers are unable to handle the tonnage, much is going directly to mills. Much of this material is light metal which is not of good quality. Mills have ample supplies but the future prospect is none too promising. In King county, Washington, more than 1500 tons has been collected.

R. H. Baldock, Oregon state highway engineer, protests priorities granted the logging and other heavy industries while the state is unable to get sufficient allocations of equipment and materials to maintain the road system. He points out that the war effort may be injured if it is impossible to keep up public highways, which carry 80 per cent of the burden.

Gov. Arthur B. Langlie of Washington has allocated state funds for four state research projects by the state planning council, in co-operation with scientists

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And it's safe—Control handle must be returned to neutral before starting. Travel speed is electrically interlocked with brake pedal. A magnetic contactor is used to open main power circuit when the operator leaves his seat.

For the complete story on Mercury Snap Action Cam Operated Controller and the full line of Mercury Material Handling Equipment write for Bulletin 201-5

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The Hydraulic Lift
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Single Unit Double Reduction Drive Axle
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at the Washington State College, Pullman. These include exploration of iron pyrite deposits in Snohomish county, iron ore deposits from which samples will be sent to the electric furnace plant at Cascade Locks, Oreg., where it is planned to produce sponge iron. A survey of magnesite deposits in Stevens county will be undertaken.

Scarcity of labor and equipment accounts for the fact that at an opening of bids for nine highway projects in Oregon only four tenders were received.

Bonneville Power Administration announces plans for additional expenditure of $1,300,000 during the current fiscal year. Equipment will be added to the Ross substation at Vancouver, Wash., including transformer banks, condensers and extension to the distribution system, to keep pace with the larger generating capacity of Grand Coulee and Bonneville.

Scarcity of steel is indicated by decision of county officials at Coquille, Oreg., to replace a bridge with a temporary structure of logs. Plans for a truss type steel span will await the end of the war.

The need for equipment is stimulating public bodies to sell used machinery. Clallam county, Washington, announces an auction Nov. 14 for the sale of a 24x36 Pioneer jaw crusher and a D8800 Caterpillar diesel engine.

While officials at the national capital are suggesting that new war contracts be withheld from this area on account of the shortage of labor and housing, the Kaiser interests at Portland, Oreg., are bringing in many new workers and have asked permission to construct 7000 additional housing units.

U. S. engineers at Portland and Seattle are handling an immense amount of construction. Of 29 major contracts awarded in this area last week the engineers placed 19 and in the previous week the engineers awarded 92 per cent of the larger projects. At Portland, W. C. Smith Inc. and Kuckenberg Construction Co. have a contract in excess of $600,000 for building structures and utilities in Jefferson county, Oregon. General Construction Co., Seattle, also has a major contract for buildings in King county, Washington. Many other awards have been made for electric, sewer and water systems and other facilities.

Canada . . .

Toronto, Ont.—Following the appeal of government officials for greater production of steel in Canada to replace curtailed deliveries from the United States, Canadian steel mills are co-operating by the frequent new production records. While it is not expected that the entire 60,000 tons monthly lost in imports from the States can be made up in Canadian mills, steel interests believe about a third of this total may be attained and possibly more with completion of new open-hearth furnaces. Officials of Steel Co. of Canada Ltd. stated that the company's plate mill in a 24-hour run turned out 1000 tons of plates in the lighter weights, which is something of a record when this mill has a rated capacity of only about 18,000 tons per month. Plate from this mill is going for production of merchant ships, corvettes, mine sweepers and other vessels. It also embraces plates for army tanks, Bren gun carriers, as well as essential needs for structural work, oil storage tanks, car building, etc. Demand on the above accounts, however, is far in excess of domestic production and it is stated in some quarters that any serious curtailment in shipments from the States to Canada may affect the high production of ships here. Sheet production also has been increased recently, but demand is absorbing all output and order backlogs are increasing steadily.

Officials of Dominion Steel & Coal Corp. Ltd., Sydney, N. S., state that the new open-hearth furnace which will increase the company's steel capacity by 75,000 tons per year will go into production in a few days. There was some delay in completing this furnace, due to late delivery of equipment, but this has been overcome. This unit will bring the company's total steel capacity to 675,000 tons per annum. Officials did not state the time they expected the new blast furnace to be completed, work being held up through difficulty in obtaining equipment from the States.

Merchant bar demand is increasing steadily despite steel saving programs that have been introduced into many war plants. On fresh commitments mills refuse to give any definite delivery promise, but are co-operating with the steel controller in filling most urgent war demands. It is stated that no bars are available to nonessential consumers and only top priority holders in essential industry are receiving anything like prompt shipment. In most war plants, however, no complaints are made regarding shortage of the general lines of steel, but there is a scarcity of special alloy

"It has increased production about 30%" at Independent Pneumatic Tool Co.

Used to cut off a great variety of stock; cold drawn tubing (2335 S.A.E., 3115 S.A.E., and 3135 S.A.E.), angle iron, and round, hex and square bars in a wide range of sizes, this MARVEL No. 8 Metal-cutting Band Saw "has increased production about 30%" in the cutting-off department of the Independent Pneumatic Tool Co., Chicago.

Cutting-off nested small diameter tubing—50 pieces per cut. On production jobs like this, the extreme accuracy and comparatively fine teeth of the blade produces smooth-edge, semi-finished pieces at very low cost.

The most versatile metal-cutting saw built, the MARVEL No. 8 a truly universal tool. It handles work up to 18" x 18" cross section; cuts at any angle from 45° right to 45° left; does mitering, notching; saves warehouse delays and "cutting extras" and saves hours of machining by roughing work to size and shape.

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MARVEL SAWS

grades required in small quantity lots.

Structural steel letting continues to taper, and under new restrictions placed on construction it is believed that by the turn of the year, shape orders will be confined to special war work approved by the government and will involve only minor tonnage.

Receipts of scrap iron and steel by dealers continue in heavy volume and yard accumulations are continually being extended, pending a lull in offerings which will enable more time for sorting, loading and shipping. Large shipments are reported from the rural districts, and there also is a continuous heavy flow from war plants. Auto wreckers have little to offer and only minor tonnages are coming from small collectors in towns and cities. Despite the record offerings of the past few weeks government interests are pressing for further expansion in salvage campaigns, seeking to obtain sufficient supplies before winter to carry consumers, especially steel mills and electric furnaces, through until next spring.

Equipment . . .

New York—Machine tool shipments will average close to 30,000 units a month the last quarter, substantially above the rate of new orders. The delivery curve is steadily upward with most expanded capacity now in production while the new orders curve moves downward, although not sharply. This is affecting backlogs with some shops; deliveries on some units are also improving, frequently due to rearranged and diverted delivery schedules, tools going to fabricators more in need of machines than the original purchaser. Pool orders account for a large part of the backlog with some builders and the industry as a whole has eight months' business at capacity production. The volume of direct negotiated contracts for the services has slackened, less so for the aircraft industry than others. Machines involved in scattered cancellations are diverted to other shops in need of equipment with little delay.

Boston—In some respects the machine tool industry has created for itself shortages of steel and materials. By equipping the largest war plant ever constructed, in record time and volume, machines built by the industry are now fabricating some steels in excess of supply; this in turn has tightened the volume available for building new machine tools, shops operating at capacity on the highest production schedules ever attained with backlogs extending beyond mid 1943 in many cases.

Increasing pressure on purchasing departments to fill requirements for materials, bearings, motors, cutting tools, high speed steels, fixtures, boring and wheel heads, parts and special steels is more apparent. While no serious production delays are noted, purchasing agents are hard put at times to maintain a safe margin on materials, including those on which it is possible to anticipate well in advance, such as motors, and notably those subject to substitution and frequent change in analysis.

High speed tool steels are becoming tighter with deliveries on cutters, reamers, taps, dies and other tools more extended, six to eight months with some producers. The machine tool industry was the first given preferential priority attention in view of its importance in the war production program. This policy still obtains to a large degree, but inflation of priorities, numerous developments in distribution control and heavier consumption of steel and materials in other directions have brought other consumers up to the machine tool builders' level with a consequent concentration of demand in higher rating brackets.

Cuba Establishes Export Quota for Copper Scrap

Cuban government has established an export quota permitting shipments of specified amounts of scrap automobile radiators and scrap copper.

Under this export quota 100 tons of scrap automobile radiators and 250 tons of scrap copper may be exported from the country. The decree further provides that such scrap material may not contain brass, bronze, tin, nickel, zinc, lead or other metals or metal alloys of value to and necessary for Cuban industries.

While the decree does not specify any time limit in which such exportation may be effected, it is understood that the quotas will be distributed among the several local holders of nonferrous scrap and will be exhausted almost immediately.

If you are charging more scrap in your open hearths to conserve pig iron, use dependable No. 34-30 Mexican Graphite to secure the necessary carbon . . . charged under the lime in basic practice it contains no sulphur, works quietly into the metal giving high carbon recovery . . . stops lime build-up and sticky heats . . . avoids foaming reactions, hot roofs, clogged checkers, long heat time and soft heats . . . Complete particulars mailed you upon request.

THE UNITED STATES GRAPHITE CO.
SAGINAW MICH.
NO. 34-30 MEXICAN GRAPHITE

Nonferrous Metal Prices

Oct.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot. N.Y.	Nickel Cathodes
1-22	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Brass

No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50

Zinc

Old	4.75- 5.00
New clippings	6.00- 6.50

Aluminum

Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25

Lead

Heavy	4.75- 5.25
Mixed babbitt	5.35- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM
(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

How to Save

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• METAL

• MONEY

making STEEL SHELL CASES

If you contemplate the manufacture of steel shell cases, here are two ACP Products that will be of interest to you.

An immersion in ACP's CUPRODINE produces a dense, adherent coating of copper which substantially reduces wear on dies, cuts time over the electrolytic method, saves plating equipment, bus bars and copper electrodes.

ACP also offers—from its war-to-war experience in metal treatment and finishing—RODINE, the inhibitor used in pickling after annealing, which produces a smooth pickled surface and minimizes embrittlement. In severe draws, this latter is of great importance.

•

Other ACP Products that contribute to the war effort are: DEOXIDINE to prepare steel, aluminum and dural for painting; LITHOFORM for coating galvanized iron to hold paint; FLOSOL, an exceptional soldering flux; KEMICK for protecting metal surfaces even when heated red-hot, and other special chemicals vital to the better, cheaper, faster finishing of metals.

Whether or not there is an ACP Product available for your needs, you are invited to bring your problems here for study and recommendations on the proper chemicals and process to help you meet today's requirements. Write today outlining your problems.

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Nonferrous Metals . . .

New York—Government officials have warned consumers of nonferrous metals that supplies of critical materials will become more acute and that users must be prepared to meet whatever additional restrictions may be ordered.

Erwin Vogelsang, chief, Tin and Lead Branch, WPB, revealed that lead is practically unique among metals today for it is the one important metal in which a shortage does not exist at the present time. "However, it is impossible to predict what future demands may be," he said, "so control must be maintained to assure an adequate supply for any unforeseen requirements." WPB recommends that lead be substituted for copper, tin and zinc wherever possible. "It appears," Mr. Vogelsang said, "that the supply of lead not only will balance with requirements this year, but will give us a reserve supply owned by the government."

St. Joseph Lead Co. announced that effective as of Oct. 19 their St. Joe brand of chemical lead will be priced at a premium of $1 a ton above the common lead price in the Mississippi valley, central freight association truck line, and New England territories. It is now priced at 6.40c, St. Louis; 6.45c, Chicago; 6.55c, New York; and 6.60c New England.

In a move to increase supplies of metals WLB granted a wage increase of $1 a day to miners in Idaho and Utah, half of which will be paid on every fourth payday only to those miners who have complied with rules governing continuity of work and standards of production. Smelters and refiners have been assigned a preference rating of AA-2X for delivery of materials for maintenance and repairs and A-1-a for operating supplies.

The shortage of tin will be alleviated somewhat by operation of WPB's order requiring trash collection agencies in all municipalities over 25,000 population in 15 northeastern states to collect and keep segregated all prepared cans offered. Subsequent disposal of the cans is also controlled.

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Chase-22-3: Connecticut manufacturer requires indefinitely subcontracting facilities for aviation motor components as follows: Breather connection bodies, supercharger drain adapters, diffuser support studs, valve rocker shafts, exhaust valve washers, main crank case studs, long breather manifold screws, long hex head screws, fillister head screws, oil manifold rocker screws and reduction drive pinion shaft, all SAE 6150 steel. Push rod ball ends of SAE 3115 steel and valve tappet rollers of AMS 6440 steel. Rear blower shaft spacers of SAE 1035 steel. Oil temperature control valve of AMS 5010 steel. Material largely bar stock. Tolerances, medium and close precision. Quantities, substantial for all items. Equipment required, screw machines or equivalent, light milling machines, drilling, thread rolling, grinding. Prints and specifications at Philadelphia office.

Chase - 51 - 1: New Jersey manufacturer requires indefinitely continued subcontracting facilities for machining aviation engine starter components of approximate dimensions as follows: Bearing ring, 3¾-inch diameter, by ¼-inch long and ball race 4 inches diameter by ⅝-inch long, both high carbon, high-chrome steel tubing; spline nut 2½-inch diameter by 1½ inches long, nickel-chrome steel; rotor shaft, 2¾-inch disc diameter by 2¾-inch shaft length, chrome-vanadium bar; intermediate head, 3⅞-inch diameter by 4½ inches long; shaft screw, 2½-inch diameter by 5⅞ inches long; threaded sleave, 2-inch diameter by 4⅝ inches long; bevel gear, 27 teeth 10 pitch, 2.7-inch PD, splined shank ⅞-inch diameter by 2 23/32-inch long. Latter four items of nickel carburizing steel. Subcontractor to furnish own material, AA-1 priority. Tolerances, medium and close. Quantities, up to 1000 per month. Equipment or equivalent required, turret lathe, thread miller and grinder, No. 7 Gleason spiral gear generator, drill press and multi-spindle drill, broach, I.D., O.D. and surface grinder, milling machine, lapper. Blueprints and specifications at Philadelphia office.

Eser-23-1: Eastern Pennsylvania concern is seeking subcontracting facilities for machining heavy gray iron castings. Weights will approximate 12,000 to 15,000 pounds each. Castings are for low pressure cylinders, pistons and beds for triple expansion engines. Tools required, large planers and vertical boring mills. Prints and specifications at Philadelphia office.

Keefer - 26 - 1: Pennsylvania manufacturer seeks subcontracting facilities on body for M-48 fuze. Material, WDX 1314 cold-rolled steel. Tolerances, plus or minus .005. Quantity, 25,000 to 50,000 per week. Equipment, 2⅝-inch multi-spindle screw machine. Prints and specifications at Philadelphia office.

Keefer - 47 - 1: Pennsylvania firm needs subcontracting facilities for manufacture of base and adapter. Size of base, 4.290-inch O.D., length 1⅝-inch, weight three pounds. Size of adapter, 2 15/16-inch O.D., 1 11/32-inch long. Weight 12 ounces. Forging facilities, turret lathe and multi-spindle automatic screw machines needed. Materials, drop forgings and cold-rolled steel, WD 1115. Prime can furnish forgings if necessary. Quantity, 500 per day of each. Priorities, AA-1, AA-2 and A-1-a. Prints and specifications at Philadelphia office.

O'Hara - 55 - 1: Pennsylvania concern requires facilities to machine 9 cast iron anvils. Castings furnished by prime contractor. Deliveries to start Nov. 15. Largest casting 100 x 63 x 57 inches; weights 36,675 to 60,000 pounds. Equipment, planer 96 inches wide, 70 high and 96 long, horizontal boring mill 3-inch bar and equipment to handle 30 tons. Priority, AA-1.

O'Hara - 55 - 2: Pennsylvania concern requires casting and machining facilities for four large anvil sub-bases. Size, 185 inches long, 111 inches wide and 45 inches high. Weight, 200,000 pounds each. Material, alloy cast iron. Equipment, heavy cast iron foundry facilities, 125 tons; handling equipment, 10 feet wide by four feet high and 16-foot stroke. Deliveries, one in February, March, April, May. Priority AA-1. Patterns to be supplied by subcontractor.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-179: New Jersey manufacturer of woodworking machinery for the armed forces seeks subcontractors to manufacture band saws, mortisers, planers, sanders, jointers, etc., in one or two-dozen lots. Will supply drawings, patterns, jigs and fixtures. Equipment required, planers, radial drills, lathes, milling machines and face grinders.

S-4012: New York manufacturer seeks subcontracting facilities for making screws and pins, including threading and knurling. Quantity, 100,000 of each of four parts. Material, steel, SAE 4140 for tubes, SAE 1020 for screws. Tolerances, .0000 plus, .0005 minus. Dimensions, .1245 x 2 inches. Equipment, 0 and 00 Brown & Sharpe automatic screw machines. Samples at New York exhibit.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

S.C. 4: Single or multiple-spindle screw machine work, for machines ⅞ to 2⅛-inch diameter bar capacity; also hand turrets and drilling. External threads on each end. Material, cold-rolled hex steel. Prime contractor will assist in procurement of material. Quantity, 28,000 each of ten sizes. Reference 1-A-251.

S.C. 5: Multiple-spindle screw machine work, for machines ¾ to 1¾-inch diameter bar capacity; also hand turrets, drilling and tapping. Material, stainless steel, 1020 solid bars and tubing. Prime contractor will assist on procurement of material. Weekly requirements, 15,000 each of six sizes. Reference 1-G-79.

S.C. 6: Heavy planer work for machines having two heads. Quantity, six each of two items Overall dimensions, 48 inches wide, 30 inches high, one item 36 and one 25 feet long. Material supplied by prime contractor. Reference 1-H-128.

Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following

S.O. No. 273: Sources to manufacture various ring and plug thread gages, urgently required. Largest size, 2¼-inches.

S.O. No. 204: Complete machining of diesel cylinder heads. Approximate dimensions 34 x 10 x 5 inches. Iron castings furnished. Quantities 600 to 1000. Drawings at Minneapolis office.

S.O. No. 209: Secondary annulus, sprocket hub and outer member. Quantities 500 to 1500 each. Forgings furnished. Requires 18 to 24-inch turret lathes, internal gear cutting and splining.

Detroit office, Contract Distribution Branch, Production Division, WPB Boulevard building, is seeking contractors for the following:

Job No. 2440: Lower bearing race. Prime contractor will furnish chrome carbon steel, ⅝-inch O.D., if necessary. Equipment, screw machine, sensitive drill, heat treating, lap hole, external and surface grinder. Priority is AA-1 and prime contractor will place orders in lots of 8000 and 16,000. Requirements are urgent.

Job No. 2533: Trunnion. Screw stock No. 654, 1¼-inch. Furnishing of material is optional. Equipment required is four or six-spindle automatic screw machine. Order is for 150,000 in lots of 50 000 on delivery schedule of 2000 or more per day. Priority is A-1-a.

Job No. 2534: Taper pin set screw. Stainless steel, type No. 303, $\frac{5}{16}$-inch O.D. Equipment, automatic screw machine, vertical press, sensitive drill, centerless grinder, immunize. Order is for 10,000 per month on A-1-a priority.

Job No. 2535: Ball stem joint. Stainless steel, type No. 303, 11/32-inch O.D. Equipment, hand screw machine, vertical press, centerless grinder, polish, immunize. Order is for 10,000 per month on A-1-a priority.

Job No. 2771: Machining operations. Rudder stock. SAE No. 2345 steel, which is furnished. Equipment, lathe 11 feet between centers, grinding attachment for lathe, mill, horizontal press, horizontal drill, braze. Order is for 204 on delivery schedule of 20 per month.

Job No. 2786: Casting source on wheels. Material is magnesium H-alloy steel. Order is for 300 to 500 per month on A-1-a priority.

Jobs No. 2779 to 2784: Prime contractor is in urgent need for production sources on elbow coupling, streamline coupling, valve seat, valve packing ring, valve packing gland, coupling, all of brass rod, which is furnished. Priority is A-1-a.

Jobs No. 2998 to 3004: Prime contractor seeks production facilities for seven jobs involving screws. Material is stainless steel from 11/64 to $\frac{5}{32}$-inch O.D. Equipment, hand

and automatic screw machines. Quantities from 10 to 4000 on each job. Priority is AA-1.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

Exhibit No. 277: (A) Threaded shell. Automatic thread rolling and cutoff machine, 7/32-inch, 18 threads. Material, brass tubing .306-inch I.D. .012-inch wall, furnished by subcontractor. Quantity, 55,000 per week. Part is cadmium plated. (B) Nut for extractor post. Equipment, ¾-inch bar capacity single-spindle automatic screw machine. Material, cold-rolled steel, furnished by subcontractor. Tolerance, plus or minus .005. Quantity, 9000 to 10,000 per week. Part is cadmium plated. Priority, on both pieces 35 per cent AA-1, remainder AA-2.

Exhibit No. 279: Gear clutch. Equipment, 5½-inch bar capacity Cleveland or National Acme automatic, recommended by prime. Material, SAE 3250 steel, furnished by subcontractor, AA-1 priority. Tolerances, minimum .008. Quantity, 7500. Production, 1200 per month. Can be machined on 4½-inch bar capacity turret lathe.

Exhibit No. 278: Auxiliary idler bracket wheel (split wheel), two halves, 16 inches O.D., 7 inches wide. Equipment, Blanchard grinder or equivalent, rotary surface grinder; will consider Matthison 36-inch diameter chuck. Material, plain carbon steel, hot-rolled, furnished by prime. Tolerance, .015. Quantity 1600 half-wheels. Production, 300 to 400 per month. Grind both sides of half-wheels, grind surfaces where half-wheels are joined.

Exhibit No. 251: Carburetor part. Equipment, ⅞-inch capacity automatic screw machine, multiple-spindle. Material, ⅞-inch diameter stainless steel, furnished by prime. Tolerance, minimum .002. Quantity, 74,000 pieces. No threading required. Prime will furnish gages and tools.

Exhibit No. 262: Turret. Equipment, 78-inch Betts vertical boring mill or equal, No. 2 Rockford horizontal boring mill with rotating table, or equal, 10-foot radial drill press. Material, armor steel casting, furnished by prime. Tolerance, liberal. Production, 30 per day. Weight 900 pounds rough.

Exhibit No. 276: Cam bearing bushing. Equipment, 1¼-inch bar capacity single-spindle automatic screw machine, bench drill press. Material, bearing bronze, SAE No. 64. Tolerance, minimum .113. Quantity, 4000 to 5000.

Exhibit No. 282: Safety valve fitting. Equipment, 1½-inch capacity single-spindle automatic screw machine, 1-inch capacity chucking turret lathe, bench lathe, No. 1 milling machine, sensitive bench drill press. Material, AMS cold-drawn stainless steel. Tolerance, .001. Production, 5000 per month. Quantity, 25,000. Number of parts, 22.

Exhibit No. 275: End cap. Equipment, 1⅛-inch bar size capacity six-spindle automatic screw machine. Second operation, 1⅛-inch capacity hand screw machine. Material, WDX1020 cold-rolled steel, furnished by prime. Tolerance, minimum .005. Quantity, 1,000,000 at 100,000 per month. Internal thread, 1¼-inch-24-NS-2.

Exhibit No. 264: Retainer. Equipment, 3¾-inch bar size capacity turret lathe, ½-inch capacity drill press. Material, SAE 1112 screw stock, furnished by prime. Tolerance, plus or minus .007. Quantity 2251.

Exhibit No. 18: Track links only. Equipment, 7000-pound or over steam hammer for forging. Production, 16,000 per month, to begin at once.

Exhibit No. 1: Valve bridge button. Equipment, 1⅛-inch bar capacity single-spindle automatic screw machine, magnetic plate B & S surface grinder, centerless grinder and radius grinder. Material, SAE 1060 steel, furnished by prime. Tolerance, .001. Quantity, 7800. Priority, AA-1.

Exhibit No. 265: Screw. Equipment, 2½-inch bar capacity single spindle automatic screw machine, No. 1 horizontal milling machine, bench drill press. Material, WD X1315 cold-rolled steel, furnished by prime. Tolerance, liberal. Quantity, 2500 to 15,000. Prime wants quotations on lots of 2500, 5000, 10,000 and 15,000.

Exhibit No. 270: Governor fitting. Equipment, No. 00 to 2½-inch capacity hand and automatic screw machine, hand millers, No. 1 horizontal milling machine, bench drill press, bench lathe, broaching and slotting. Material, cold-rolled stainless steel, brass rod, aluminum alloy, furnished by sub. Priority AA-1. Tolerance, close. Quantity, 3500 to 40,000. Number of parts, 35. Production, 500 to 7000 per month.

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SHAPE AWARDS COMPARED

	Tons
Week ended Oct. 24	0,000
Week ended Oct. 17	1,175
Week ended Oct. 10	1,128
This week, 1941	44,230
Weekly average, 1942	17,724
Weekly average, 1941	27,284
Weekly average, Sept., 1942	3,290
Total to date, 1941	1,205,508
Total to date, 1942	762,130

Includes awards of 100 tons or more.

STRUCTURAL SHAPES...

SHAPE CONTRACTS PENDING

140 tons, viaduct, Franklin avenue, Erie, Pa.; bids to state highway department, Harrisburg, Pa., Oct. 30.

142 tons, state access bridge, Erie, Pa.; bids Oct. 30.

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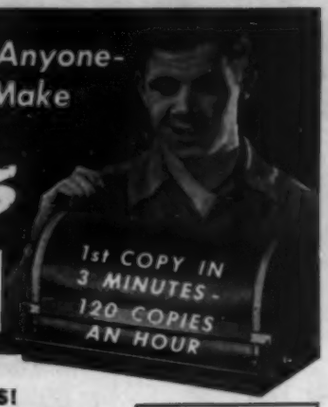

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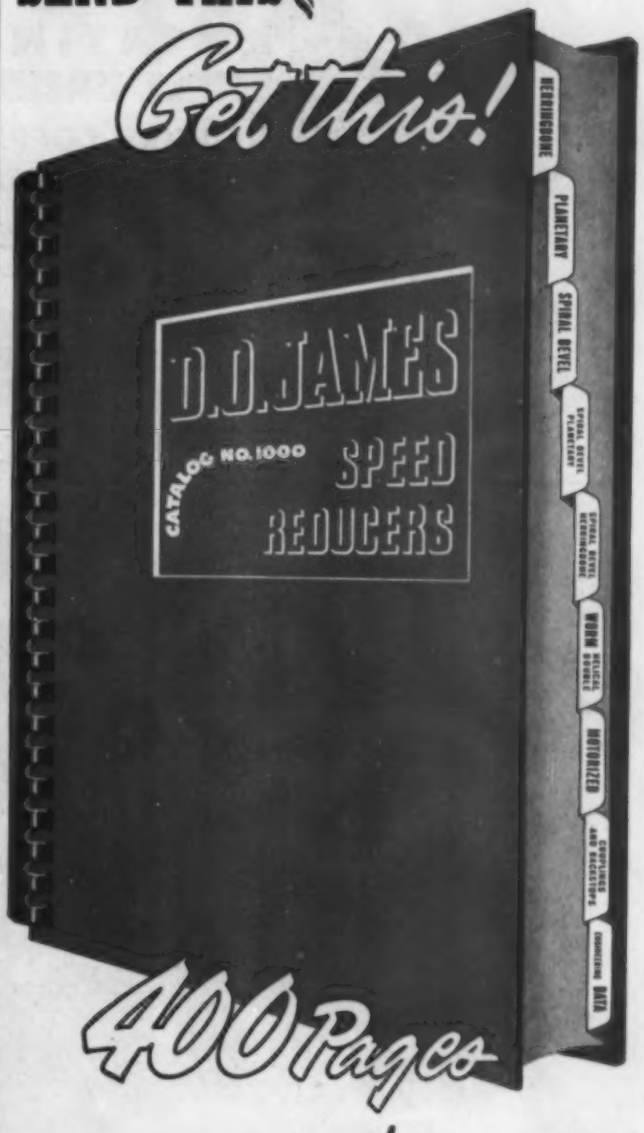

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REINFORCING BARS . . .

REINFORCING STEEL PENDING

350 tons, aviation materials storage depot, Philadelphia, bids Oct. 24; fourth section of project, Ralph Herzog and W. H. Horst, Philadelphia, contractors.

RAILS, CARS . . .

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New York Central, 25 locomotives, 4-8-2 type, to Lima Locomotive Works, Lima, O.

BUSES BOOKED

Twin Coach Co., Kent, O.: Ten 35-passenger for Syracuse Transit Corp., Syracuse, N. Y.; eight 41-passenger for Tacoma Transit Co., Tacoma, Wash.; four 31-passenger for British Columbia Electric Railway, Vancouver, B. C.

CONCRETE BARS COMPARED

	Tons
Week ended Oct. 24	0,000
Week ended Oct. 17	366
Week ended Oct. 10	2,853
This week, 1941	14.522
Weekly average, 1942	7,979
Weekly average, 1941	13,609
Weekly average, Sept., 1942	4,708
Total to date, 1941	623,609
Total to date, 1942	343,105

Includes awards of 100 tons or more.

NE Steels Put Under "Dislocated" Schedule

Dislocated tonnage provisions of revised price schedule No. 49, applying to resale iron and steel products, may be used in establishing prices of dislocated tonnage shipments of the new national emergency grade steels, Office of Price Administration announces. This applies generally to shipments to points outside the seller's normal marketing area and allows the seller to recover most of the added transportation cost. National emergency steels are new low-alloys developed to conserve molybdenum, nickel and chromium.

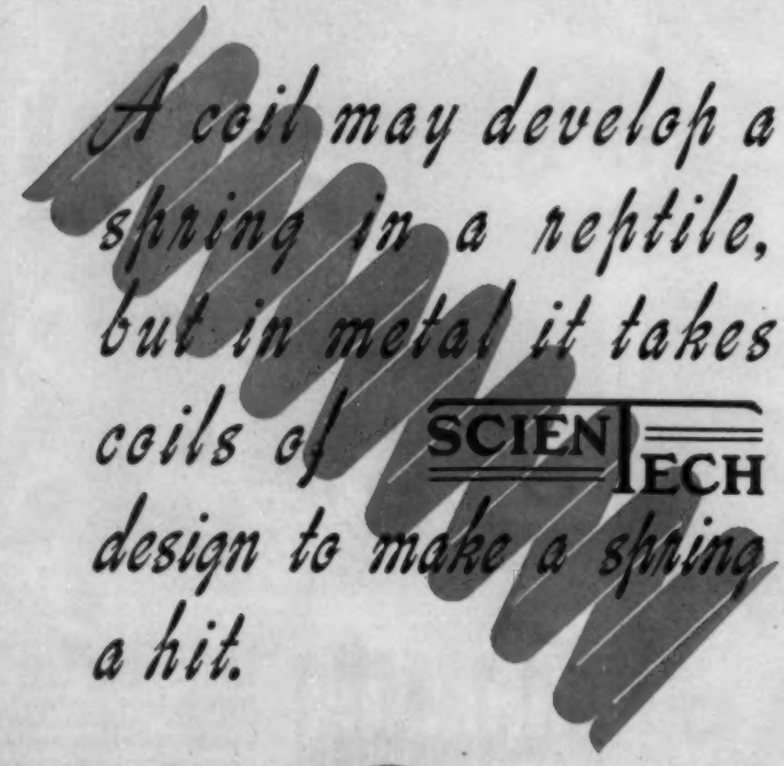
Maximum Prices Established For Malleable Iron Castings

Maximum prices for malleable iron castings have been established by OPA. Regulation 241 provides:

(1) Maximum prices for each seller of malleable iron castings shall be the highest prices the seller was charging for the same or substantially the same castings between Oct. 1 and Oct. 15, 1941, inclusive; or

(2) If the castings to be priced were not sold between Oct. 1 and Oct. 15, 1941, maximum prices are to be computed according to the pricing method and costs and profit margins in effect for the seller on Oct. 15, 1941 (with certain exceptions for overhead rates, costs of materials, and outside machining).

In determining the prices of castings which are not substantially the same as



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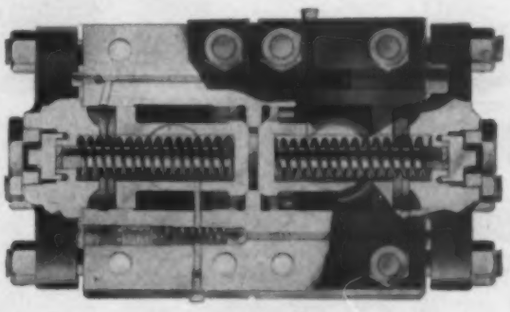

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those sold by the seller between Oct. 1 and Oct. 15, 1941, the seller must use the pricing method used by him on Oct. 15, 1941, employing the various cost and profit factors used by him on that date, with the following three exceptions:

(1) Direct material costs must be computed on a basis no higher than the actual costs to the seller of such materials, not to exceed the applicable OPA maximum prices, whether these costs are higher or lower than those prevailing on Oct. 15, 1941.

(2) Costs of machining let out to other firms may be computed on the basis of the seller's actual costs, not to exceed OPA maximums, even though these are higher than his costs on Oct. 15, 1941.

(3) Overhead or "burden" rates are to be computed on the basis of the seller's actual costs and volume of production for the period from Jan. 1, 1942, to June 30, 1942, with labor costs adjusted, however, on the basis of Oct. 15, 1941, wage rates. The seller is permitted to use such overhead rates even though these may be higher than the rates used on Oct. 15, 1941.

The regulation requires that by Nov. 20 each seller of malleable iron castings must file with his regional OPA office three copies of his published price lists in effect between Oct. 1 and Oct. 15, 1941. By Dec. 20 he must file with the OPA regional office information as to wage rates, profit margins and pricing methods in effect for him on Oct. 15, 1941. OPA will provide forms for filing this latter information.

CONSTRUCTION AND ENTERPRISE

OHIO

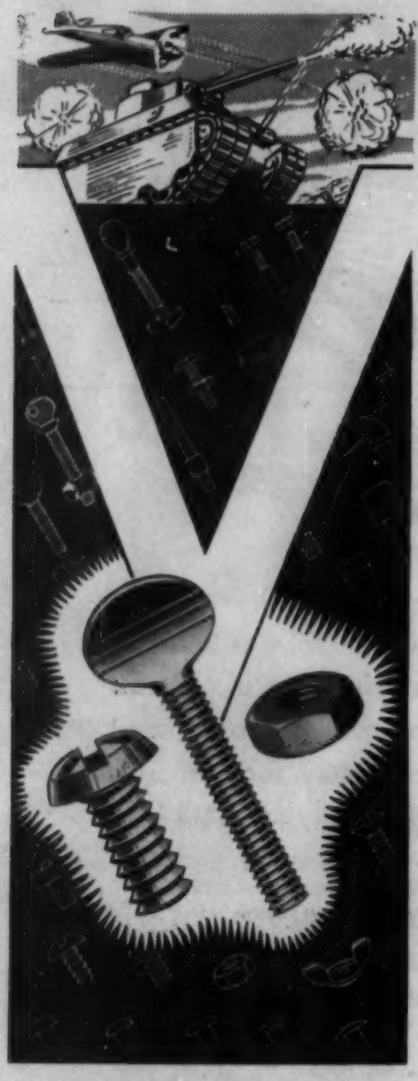
AKRON, O.—B. F. Goodrich Co., 500 South Main street, is continuing expansion program with $40,000 chemical engineering building at plant No. 3, on which construction bids are being received.

BOWLING GREEN, O.—A combined office and factory building will be erected by E. J. Benes Co., Cleveland, for the Greider Machine Tool & Die Co., Bowling Green.

CLEVELAND—Bolton-Pratt Co. has contract for an addition to plant of Artisan Metal Works Co., 11400 Madison avenue.

CLEVELAND—Meckler Chemical Corp. is being organized by Joseph George Meckler, 3306 East Overlook road, to manufacture chemicals.

CLEVELAND—Cleveland Electric Illuminating Co., Public square, plans $200,000 elec-



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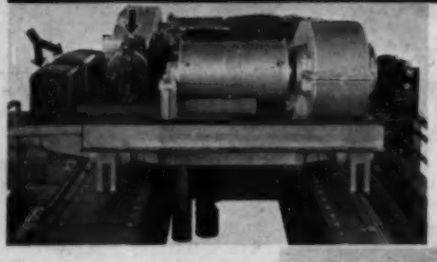

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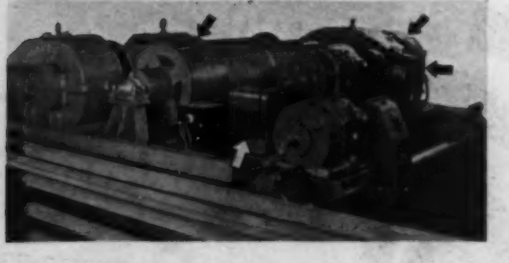

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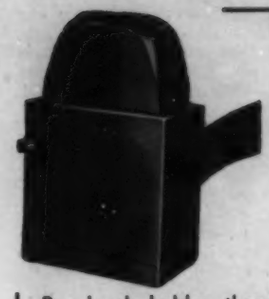

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tric substation at 3190 Quigley road. W. H. Hartman is purchasing agent.

CLEVELAND—Johnston & Jennings Co., 877 Addison road, will operate detinning plant to be erected by H. K. Ferguson Co., Hanna building, financed by RFC at estimated cost of $1,000,000.

CLEVELAND—Reliance Electric & Engineering Co., 1088 Ivanhoe road, has leased plant at 1190 East 152nd street. The marine division of Reliance will operate separately at this location.

CLEVELAND—National Cylinder Gas Co., Harold W. Gray, district manager, is adding 14,000-square foot oxygen building and a 6400-square foot acetylene building to its plant at 1151 East 222nd street, Euclid, O. George Ricker is handling the project at main office, 400 West Madison street, Chicago.

CLEVELAND—Park Drop Forge Co., East Seventy-ninth street, Fred L. Ball, secretary-treasurer, is planning erection of engineering building containing 4000 square feet of space.

CLEVELAND—Wallace Hatch, engineer, is designing an addition to a shop building to be used by an unidentified galvanizing company. The 1700-square foot extension will be built on a former garage building on Superior road, south of Mayfield.

CLEVELAND—H. K. Ferguson Co., Hanna building, Cleveland, has been awarded contract for additional facilities at manufacturing plant to cost between $100,000 and $300,000 to be located in Allegheny county, Pa. Owner, United States Defense Plant Corp., Washington. Lessee and plant operator, Vulcan Detinning Co., Neville Island, Pa.

LORAIN, O.—Brush Beryllium Co., First and Hamilton streets, Lorain, and 3714 Chester avenue, Cleveland, is starting work on chemical plant and a small smelting plant. The $750,000 project will include furnaces, evaporators, ore equipment, etc. H. K. Ferguson Co., Hanna building, Cleveland, is engineer-contractor.

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MASSACHUSETTS

SPRINGFIELD, MASS.—Smith & Wesson, 55 Stockbridge street, has let contract for two-story 96 x 105-foot storage and manufacturing plant to E. F. Carlson Inc., 1649 Main street. Estimated cost $45,000.

PENNSYLVANIA

ERIE, PA.—J. H. Williams Co., New York, is expected to take over former Nagle property at Twelfth and East avenues here for the site of an aluminum drop forging plant.

GENESEE, PA.—Genesee Chemical Co., C. Carpenter, general manager, will rebuild factory at cost of $50,000.

PHILADELPHIA—SKF Industries Inc., Front and Erie streets, has let contract for one-story 105 x 107-foot plant to Turner Construction Co., 420 Lexington avenue, New York. Estimated cost $120,000.

NEW YORK

BUFFALO—Federal Works Agency, 2 Lafayette street, New York, will expand water facilities here. Estimated cost $86,000.

LARCHMONT, N. Y.—J. Winkel Co. Inc., 148 Larchmont avenue, has contract from industrial company in Connecticut for boiler plant. Estimated cost $105,000.

NEW YORK—Air Reduction Sales Corp., 60 East Forty-second street, New York, will operate a one-story, 65 x 135-foot plant, to be built by Defense Plant Corp., at Sparrows Point, Md., for production of oxygen.

UTICA, N. Y.—Utica Radiator Corp., 2201 Dwyer avenue, plans factory addition. Giffels & Vallet, Marquette building, Detroit, engineer. Estimated cost $250,000.

NEW JERSEY

JERSEY CITY, N. J.—William Neumann & Sons, 487 Summit avenue, is preparing plans for an industrial company for altering and constructing plant. Estimated cost $1,500,000. Navy Department will finance project.

LYNDHURST, N. J.—Leslie Co., Grant avenue, has asked bids for boiler plant. P. Wunderlich, 70 East Forty-fifth street, New York, engineer.

MICHIGAN

BATTLE CREEK, MICH.—Simmons Stoker Co. has plans by A. B. Channel, for one-story 43 x 138-foot and 56 x 120-foot factory. Estimated cost $100,000.

DETROIT—Machinery Design Inc., 204 Basso building, has been organized to design and build production machinery. Norman Van Husen Sr., 17792 Northrop, agent.

DETROIT—Detroit Tool Salvage Corp., 3548 Mitchell, has been organized to rework and convert milling cutters. Charles L. McKeehan, 11025 Chelsea, agent.

DETROIT—Barton Malow Co., 2631 Woodward avenue, has contract from industrial company for factory estimated to cost $100,-

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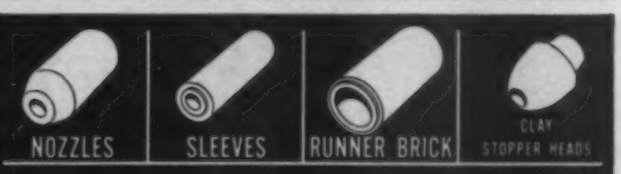

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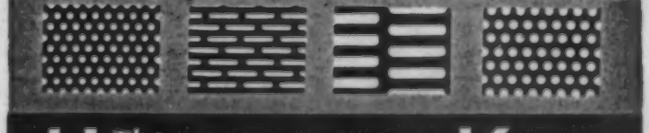
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New York Office—114 Liberty St.

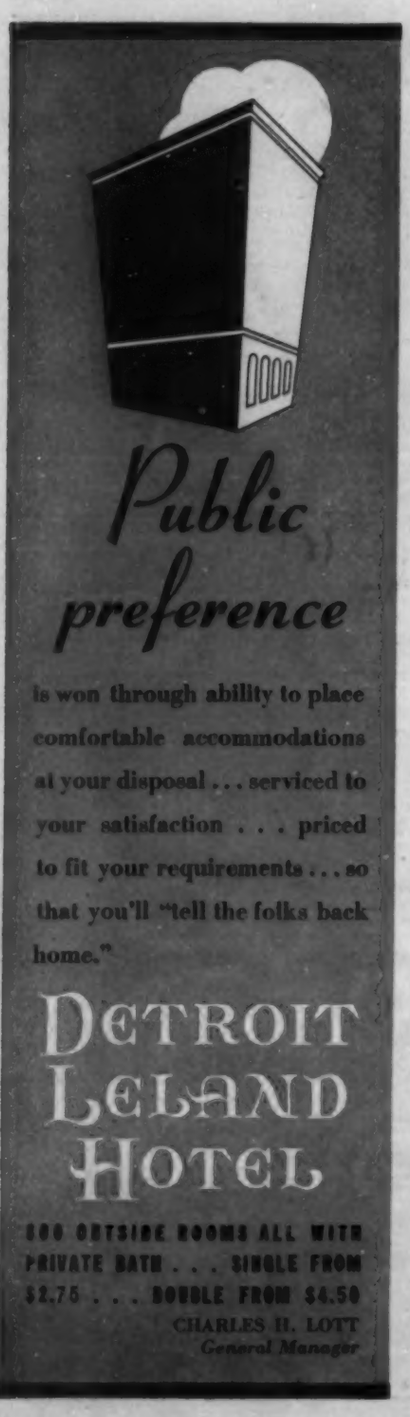
000. Malcomson, Calder & Hammond, 1219 Griswold street, architect.

DETROIT—Champion Tool & Die Co., 1751 East Nevada avenue, has been incorporated with $50,000 capital to deal in dies, jigs, fixtures and gages. Alexander C. Taflan, 17851 Marx avenue, agent.

HILLSDALE, MICH.—E. D. Moon, Toledo, O., has acquired former grade school here in which he plans to establish a factory for manufacture of airplane generator commutators. Plant will be known as Hillsdale Commutator Co., and will be managed by Chauncey F. Cook Jr., vice president.

ILLINOIS

CHICAGO—United States Engineer, 520 Merchandise Mart, Chicago, plans manufacturing plant in Indiana. Cost over $5,000,000.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MELROSE PARK, ILL.—Work has been started on machine shop and office building for National Malleable & Steel Castings Co., 103 North Twenty-fifth street, Melrose Park.

INDIANA

HAMMOND, IND.—A. L. Jackson Co., 161 East Erie street, general contractor, is taking bids on subcontracts for foundry addition to Hammond Brass Works.

PRINCETON, IND.—Southern railway, B. Herman, chief engineer, Washington, is rebuilding car shops here which were destroyed by fire. Estimated cost, including equipment, $50,000.

MARYLAND

BALTIMORE—Harry A. Smuck has built a plant, to be equipped for general machine shop work, on Cherry Hill Lane here.

CURTIS BAY, MD.—U. S. Industrial Chemicals Inc., 60 East Forty-second street, has plans for $1,000,000 process plant here. United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, engineers.

ALABAMA

LISTER HILL, ALA.—Reynolds Metals Corp., R. S. Reynolds, president, Richmond, Va., plans $5,000,000 expansion at plant here.

KENTUCKY

LOUISVILLE, KY.—United States Engineer, Federal building, Louisville, plans conversion of plant in Indiana. Cost between $1,000,000 and $5,000,000.

FLORIDA

POLK COUNTY, FLA.—Brandon Electric Co., Deland, Fla., has contract for electric distribution system here. United States district engineer office, P. O. Box 4970, Jacksonville, Fla., in charge.

TEXAS

BEAUMONT, TEX.—Oil City Brass Works, 326 Neches street, is taking bids for remodeling present plant and constructing new buildings. Steinman & Coleman, Liberty building, Beaumont, architects.

DENISON, TEX.—United States Engineer, 231 West Main street, Denison, plans additional water supply facilities in Tarrant county, for which $750,000 has been authorized.

NEBRASKA

OMAHA, NEBR.—Omaha Steel Works, 609 South Forty-eighth street, will spend approximately $700,000 for foundry addition.

OMAHA, NEBR.—United States Engineer, 1709 Jackson street, Omaha, will expand manufacturing plant in Iowa. Cost exceeds $2,000,000.

CALIFORNIA

ARLINGTON, CALIF.—American Tin Corp. will build a 100-ton pilot mill near here. Project has been approved by WPB. George W. Bryant, vice president, is in charge.

BURBANK, CALIF.—Lockheed Aircraft Corp. is erecting a warehouse, 300 x 680 feet, at 1101 Victory boulevard. Estimated cost $50,000.

LOS ANGELES—Triangle Tool & Machine Works, 1317 South Main street, is erecting an addition to its plant, 60 x 66 feet.

PATTERSON, CALIF.—General Dry Battery Co. will build a magnetic separator plant here. Estimated cost $100,000.

CANADA

ACTON, ONT.—Armaco Ltd., 24 Wellington street West, Toronto, plans plant addition here to cost about $35,000 with equipment.

GALT, ONT.—Babcock-Wilcox, and Goldie-McCulloch Ltd., 64 Grand avenue South, have given general contract to G. H. Thomas & Son Ltd., 45 Dickson street, for plant addition to cost $25,000. Equipment to be installed includes Link-Belt Speeder Ls-40 tractor crawler crane; Wilson horizontal welding machines; No. 508 Chicago steel press brake.

GRAVENHURST, ONT.—Royal Norwegian Air Force, 341 Church street, Toronto, plans air force depot buildings, barracks, etc., and installation of repair equipment and other machinery, to cost about $200,000.

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, has given general contract to Canadian Engineering & Contracting Co. Ltd., 25 Hughson street South, for small plant addition to cost about $10,000, which is in addition to other plant extensions underway. Frid Construction Co. Ltd., 126 King street East, has general contract

HAMILTON, ONT.—Hamilton Bridge Co. Ltd., Bay street North, has given general contract to Frid Construction Co. Ltd., 126 King street East, for addition to No. 2 shop, one story, 50 x 100 feet, and alterations to No. 1 shop. Estimated cost about $150,000 with equipment.

HAMILTON, ONT.—Burlington Steel Co. Ltd., Sherman avenue North, has given general contract to H. Cooper Construction Co. Ltd., 306 Medical Arts building, for plant addition to cost about $12,000. Prack & Prack, architects, Pigott building.

LEASIDE, ONT.—Sutton-Horsley Co. Ltd., 263 Adelaide street, Toronto, is having plans prepared and will let contracts soon for plant addition to cost about $120,000 including equipment.

OTTAWA, ONT.—Modern Containers Ltd., 346 Queen street, will start work soon on plant addition, one story, 80 x 100 feet, and install lathes, grinders, presses, etc., estimated to cost about $50,000.

TORONTO, ONT.—Acme Ruler & Advertising Co. Ltd., 512 Rhodes avenue, has given general contract to Chestnut-McGregor Ltd., 96 Bloor street West, for rebuilding plant recently destroyed by fire, to cost about $50,000 with equipment.

TORONTO, ONT.—Anchor Cap & Closure Corp. of Canada Ltd., 275 Wallace avenue, has given general contract to Mollenhaur Contracting Co. Ltd., 188 Perth avenue, for addition to plant to cost about $25,000 with equipment. Mathers & Haldenby, 96 Bloor street West, architects.

WALKERTON, ONT.—Canada Spool & Bobbin Co. Ltd., Colborne street, plans plant addition, estimated to cost $30,000 with equipment.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., Sandwich street East, is having plans prepared for plant addition, one story, 60 x 208 feet, to cost about $65,000.

MONTREAL, QUE.—Fairchild Aircraft Ltd., in association with Department of Munitions and Supply, H. H. Turnbull, secretary, is taking bids for plant addition at the Longueuil works, building to be 520 x 630 feet, and cost with equipment about $500,000.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, is taking bids through Spence & Burge, architects, 2063 Union avenue, for addition to Dominion works, Ville St. Pierre. Cost with equipment about $100,000.

QUEBEC, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Magloire, Couchon Ltee, 311 de la Salle street, for addition to Dominion arsenal here to cost about $60,000 with equipment.

SHAWINIGAN FALLS, QUE.—Shawinigan Terminal Railway Co. plans to start work immediately on addition to engine house and install new equipment, estimated to cost about $25,000.

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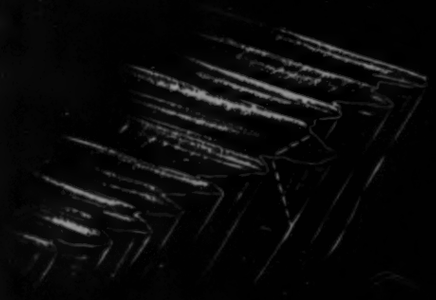

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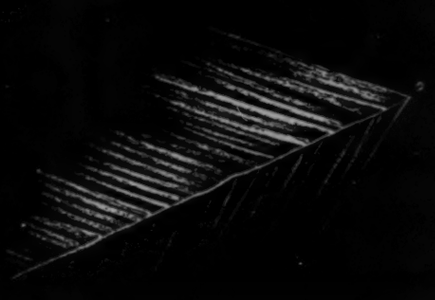

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